

Health Spending Growth Drivers in Vermont: Medicaid and Commercial Insured, 2008-2012

Vermont residents

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Table of Contents

Definition of terms.....	3
1. Executive Summary.....	5
2. Background.....	10
3. Methods.....	11
4. Results: Overview of health spending levels and growth.....	15
5. Drivers of health spending growth: Acute inpatient stays.....	16
6. Drivers of health spending growth: Outpatient facility care.....	26
7. Drivers of health spending growth: Physician and other professional services.....	33
8. Medicaid government health care activities.....	39
9. Summary of findings.....	40
10. Conclusions/Recommendations.....	41
Appendix A: Supplemental tables.....	44
Appendix B: Technical notes.....	53

Definition of terms

Case mix - a description of the severity or complexity of patients admitted to a hospital. Average DRG weight (e.g., using MS-DRG v26 for 2008) attempts to measure case mix and facilitate fair comparison of cost of treatment.

Annual enrollment - total monthly enrollment, based on VHCURES enrollment data, divided by 12.

Inpatient acute stays - includes all inpatient stays at acute care hospitals. Consistent with Truven defined CASEID, which measures consecutive room and board days as a “stay.” For this analysis, hospital stays exclude all physician and other professional services that are provided within a hospitalization, as these are included under the “professional services” category.

Inpatient services - Includes all institutional claims submitted for dates within the stay dates with UB-04 revenue codes from: hospital inpatient facilities, renal dialysis centers, rehabilitation facilities, freestanding birth centers, and critical access hospitals.

Intensity – A measure of the number and complexity of services and resource use within a hospital stay. For example, the number and technologic complexity of the diagnostic imaging tests provided during a hospital stay. Intensity is a further adjustment to inpatient stays after case mix is accounted for. Intensity is calculated using DRG weights.

Medicaid limited benefit plans - plans that are designed with limited scope of covered services as compared to the traditional Medicaid plans. Example: Catamount, which covers premiums and limited benefits for some individuals in commercial plans.

Medicaid-specific service codes - Medicaid service codes that have been defined in the outpatient sector as Category of Service (COS) equals Government Health Care Activities (GHCA) have been separated out within professional services.

Service mix - the distribution of health care services within categories during a defined period of time. Service mix may be calculated at the state, the region, or even the hospital level. Service mix is calculated as a combined control for intensity and case-mix for outpatient or professional services because there is nothing equivalent to a DRG weight available for all outpatient or professional services.

Outpatient facility services - institutional claims submitted with UB-04 (facility-based) revenue codes, including: hospital outpatient, hospital lab services to non-patients, skilled nursing outpatient, rural clinics, renal dialysis centers, freestanding clinics, outpatient rehab facilities, community mental health centers, federally qualified health centers, clinic/other, hospice facilities, ambulatory surgery centers, freestanding birthing centers, and critical access hospitals.

Price growth - the percentage change in allowed payment of some standard measure of service (the market basket in the case of outpatient and professional services, or a hospitalization with unit DRG weight in the case of inpatient stays). Price growth is the increase in allowed payment after adjustment for other factors such as mix of services and utilization in the case of outpatient or professional services, or intensity, case mix, and volume in the case of inpatient services.

Professional services - includes professional bills, CMS 1500 form professional services procedure codes with no facility charges. This includes all professional physician and non-MD services (e.g., physical therapy, occupational therapy).

Spending growth - the increase in allowed payment amount PMPY from one time period (a year) to another. In this report, annualized spending growth is measured both as an overall measure for all service types, and by different service types (inpatient, outpatient, professional services).

Spending per member per year (PMPY) - the ratio of total allowed payment amount to annual enrollment.

Total allowed payment amount - the sum of payments made by the insurance providers (payer) to the health care providers for medical services provided to the patients, and patient's out-of pocket costs (co-insurance, co-payments, deductibles), for all non-drug services.

UB-04- a uniform institutional billing form used in billing by multiple payers. It pertains to facility-based services.

Volume of services - the number of health care services (stays or individual services) provided during a defined period of time. Volume of service can be calculated for the state, for a region, for a provider, or for a population group.

1. Executive summary

1.1 Overview

Vermont health expenditures have increased at 4.5 percent annually since 2007, slightly faster than the national average.¹ Health spending growth results from a combination of changes in population health, payments for services and the number and mix of services used. To manage and control future health spending, it is critical to understand the underlying factors that have contributed to health spending growth over time. This analysis examines the portion of health spending growth between 2008 and 2012 that was incurred due to increased payments per service (“price”), increased service use, and a change in the mix of services over time. This spending analysis was conducted for hospital acute inpatient facility services, outpatient facilities, and physician and other professional services. Spending growth drivers are examined both statewide and by region of resident within Vermont.

This claims-based study focuses on Vermont residents with commercial insurance and Medicaid. The dually eligible Medicare/Medicaid population is excluded from this analysis, as data were unavailable. Health spending includes total allowed paid amounts for a service, including both the payer portion and the patient out-of-pocket portion, for all services excluding prescription drugs. Additional payments to hospitals or providers that are not associated with claims (e.g., care management payments, or disproportionate share payments to hospitals) are also excluded from this analysis.

The data source for these analyses is the Vermont Healthcare Uniform Reporting and Evaluation System (VHCURES). These analyses are restricted to Vermont residents under age 65, and who are not also enrolled in Medicare (the dually eligible are excluded). The analytic sample includes approximately 300,000 commercially insured Vermont residents, and between 100,000 to 125,000 full-benefit Medicaid beneficiaries per year (See **Appendix A1**).²

1.2 Findings

Overall health spending levels and growth: Health spending per member per year (PMPY), excluding prescription drugs, for Vermont’s commercially insured residents, grew at an average annual rate of 4.8 percent between 2008 and 2012 (\$3,467 to \$4,187). **This average reflects a slowing of growth in commercial spending each year after 2008, from over seven percent in 2008-2009 to 2.5 percent in 2011-2012. By 2012, growth was slower than the national average for employer-based coverage.**³ For Medicaid beneficiaries, the average growth rate in spending per beneficiary was slower than commercial, at 1.7 percent annually (\$4,752 to \$5,090).

¹ Vermont Health Expenditure Report, Green Mountain Care Board (updated), March 2015.
(http://gmcboard.vermont.gov/sites/gmcboard/files/Large/2012VT_HC_EA.pdf).

² Because of the wide range of programs and benefits packages that are provided through Medicaid, individuals with limited benefit plans (partial benefits which only cover a limited scope of services) are excluded. Members of Catamount are also excluded from Medicaid analyses, as they are mostly covered through commercial plans, and are included in the commercial analyses.

³ Health Care Cost Institute, 2012 Health Care Cost and Utilization Report, September 2013
(<http://www.healthcostinstitute.org/files/2012report.pdf>)

Spending growth drivers: Price (allowed payments) per service or per admission grew faster than any other component of expenditure growth for most service categories for both Medicaid and commercially insured residents.

For hospital acute inpatient facility care, the average case-mix adjusted price per inpatient admission for Medicaid grew nearly twice as fast as commercial payments, at 8.9 versus 4.1 percent per year. However, while the gap between Medicaid and commercial spending per admission decreased, Medicaid spending per admission remained lower on average than commercial (\$10,172 versus \$16,584 in 2012). Inpatient price growth for commercial carriers was consistent with or higher than published studies of national data through 2011, though average admission spending remained lower than national.^{4,5} On a per-enrollee basis, the rate of admissions was higher for Medicaid than commercial (90.6 versus 47.7 per 1,000 in 2012), with commercial rates approximately 30 percent lower than the national average.⁶ Admission rates decreased for both payers between 2008 and 2012.

For outpatient facility services (mostly hospital-based), spending per member per year grew faster for commercial than Medicaid (6.4 versus 4.1 percent annually). Spending growth is lower than national data for commercial spending, but comparisons are limited by differences across studies in defining visits. Prices grew twice as fast for commercial, at 5.6 percent annually, compared to 2.6 percent for Medicaid. However, comparison across payer type is limited due to differences in definitions, coding practices, and types of services offered for each.

For physician and other professional services (which includes both inpatient and outpatient place of service), spending per member increased for commercial insurance by just over two percent annually for commercial, mostly due to price increases, again, slower than national data.⁷

Over half of Medicaid professional services spending was in the category of government health care activities (GHCA). GHCA includes special programs in mental health, and other services, with no corresponding category in commercial. This category could not be decomposed into spending drivers, because of the heterogeneous nature of the services. However, this category remained flat in terms of spending per resident, for the non-dual eligible population.⁸

Additional findings include:

- **For both payers, there was variation in inpatient spending growth by geographic location of resident within Vermont.** From the resident perspective (all admissions, regardless of location of service), commercial payments per member per year for acute hospitalizations increased

⁴ Lemieux J and Mulligan T. Trends in inpatient hospital prices, 2008 to 2010. *American Journal of Managed Care* 2013;19(3):e106-e113.

⁵ HCCI Vermont Health Care Cost and Utilization Report, December 2014. (http://www.healthcostinstitute.org/files/2007-2011VermontHCCUR_DecemberRevision%2012-11-14.pdf)

⁶ Health Care Cost Institute, 2012 Health Care Cost and Utilization Report, September 2013 (<http://www.healthcostinstitute.org/files/2012report.pdf>)

⁷ Health Care Cost Institute, 2012 Health Care Cost and Utilization Report, September 2013 (<http://www.healthcostinstitute.org/files/2012report.pdf>)

⁸ Many GHCA services are provided to the dually eligible population, and are not included in this study. Only those GHCA services provided to Medicaid-only beneficiaries are included.

most for residents of the Upper Valley area (nearly twice that of the Vermont average). The fastest pure price growth was for residents of the Rutland and Burlington area. For Medicaid, per resident per year spending growth was highest for residents in the St. Johnsbury/Newport region, which started at the lowest average spending per admission.⁹

- **For outpatient facility services, the categories contributing to overall spending growth were similar across payers, with radiology, hospital pharmacy and supplies, and outpatient surgery being the greatest contributors to increased spending.**
- **Observed billing trends and patterns reveal a shift away from stand-alone outpatient professional services toward more facility-based outpatient services.** The changing mix of services in the outpatient setting over time, including the increased use of facility-based radiology, pharmacy, and outpatient surgery, reflects national trends. As shown in other studies, the cost of a service generally is higher when provided in an outpatient facility, rather than a physician's office, adjusted for service category mix.
- Medicaid provides considerable services in categories related to care management and behavioral health, defined as government health care activities (GHCA). These services include mental health and social services, such as case management, day treatment, and assistive community care. These are not comparable to services provided in the commercial sector.

1.3 Conclusions and recommendations

For the period studied and all services, increases in prices per hospital stay or facility payments for Vermont residents, in all regions, more than offset any volume decrease. There were variations across region, payer, and hospital, with certain regions experiencing consistently higher spending and spending growth, even after adjusting for intensity of care. Out-of-state hospital use (both for nearby New Hampshire and for other states) is also increasing, especially for Medicaid. These admissions (unadjusted for case mix) are more expensive on average than Vermont hospitals. The payment and utilization patterns identified in this report can inform the design of alternative payment models and fee-for-service contracting over time.

Outpatient and professional services have experienced a change in setting over time, toward increasing use of facility-based (rather than office-based) radiology, pharmacy, and outpatient surgery, and slower growth in these services at non-hospital based offices. This parallels national trends, as providers nationally and in Vermont have consolidated within hospital or healthcare systems (e.g., implementation of accountable care organizations [ACOs]). It is also consistent with national trends toward higher prices related to hospital facility-based services versus outpatient professional offices,¹⁰ and with the results of the recent Vermont Price Variation Study,¹¹ which provides a snapshot at a point

⁹ Note that although Medicaid typically pays a set DRG rate per admission, there are additional costs for the stay that vary by admission. As well, differences in Medicaid price growth per region are due to differences in case mix across regions.

¹⁰ Reschovsky JD, White C. Location, location, location: Hospital outpatient prices much higher than community settings for identical services. National Institute for Health Care Reform Issue Brief no.16, June 2014 (<http://www.nihcr.org/Hospital-Outpatient-Prices>).

¹¹ *Price Variation Analysis*, Prepared for the Green Mountain Care Board, August 2014.

in time (2011). Further examination using VHCURES can be conducted to reveal which services are most responsible for this trend, and how this impacts payments for particular services. This report should encourage policy makers and providers to identify efficient, high quality, providers for outpatient and diagnostic services, and move toward payment rates that support such providers and payments. A longer term issue to consider is the concept of ownership and service site in reimbursement policy.

Because this study is largely resident-based (rather than provider-based), the wide variation in spending and growth over time by resident location cannot be attributed directly to certain hospitals or providers. This study does not show where patients receive care, so, for most part, results do not indicate how pricing is changing for individual facilities (with the exception of Dartmouth-Hitchcock and UVM Medical Centers in the inpatient analysis). The market analysis study being conducted at present will fill in this gap, by indicating where patients in each market area receive care, and associated costs.

Recommendations:

This study focuses on drivers of spending growth over time. It should be considered within the context of other studies recently conducted for the Green Mountain Care Board that provide a snapshot in time of price variation across services. For instance, while price variation is the result of historic patterns, it is important to consider the services that have been growing fastest, and locations with highest spending increases in recent years and the baselines from which the spending is growing. The considerable differences across locations in Vermont resident health spending growth should be reviewed, particularly price differences over time for the most expensive areas.

The structure of the VHCURES data do not allow for detailed analysis of Medicaid GHCA services and comparison to trends for commercial payers. Consistent measurement of service offerings across payers, and reflected in VHCURES, could improve analysts' ability to understand trends even as new reimbursement strategies are introduced.

Because Medicare data were not available at the time this study was conducted, spending growth patterns for nearly half of hospital admissions were not analyzed. Nor were patterns for the dually eligible Medicare/Medicaid beneficiaries, who are some of the highest cost residents. It is important to extend this analysis to Medicare and dually eligible beneficiaries, in order to better understand how commercial and Medicaid spending has changed within the context of Medicare payment changes over time, including looking at evidence of cost-shifting. A study is currently underway that will provide this information.

Particular additional findings may warrant further analysis and discussion. These include:

- The rapid growth in price per admission for Medicaid beneficiaries may be the result of policies directed toward improving reimbursement to be closer to commercial rates. During the early study years, Medicaid moved from a per diem reimbursement to a prospective payment DRG approach. This analysis informs the extent to which Medicaid hospital payments are still lower than commercial. In addition, the differences in patterns of use for Medicaid beneficiaries across locations may warrant further examination.

- Upper Valley is the only region that is increasing in inpatient utilization per member for the commercial and Medicaid population. In 2012, it residents were among the Vermont regions with highest commercial spending per admission (and lowest Medicaid spending per admission). Similarly, Dartmouth-Hitchcock shows positive utilization growth for inpatient care, compared to the University of Vermont Medical Center (UVMHC), and other Vermont acute care hospitals, where on average, admissions per enrollee decreased. Higher commercial spending per admission at Dartmouth-Hitchcock compared to other hospitals, however, is largely due to a more complex DRG case mix, rather than solely increased prices for the same services.

2. Background

2.1 Purpose/Rationale of study

Health spending growth results from a combination of changes in payments for services and the number and mix of services used. The change in number and mix of services used is driven by population need and demand, as well as by clinical practice patterns and variations in available technology. Payments for services are determined by a combination of supply and demand factors, including Federal and state payment policies, market structure, provider costs, and negotiated rates. Because different policy levers are needed to address the various factors affecting health expenditure growth, knowing the relative impacts of these factors is critical for policy decision making.

While some drivers of increased health spending are beyond the control of the health delivery system,^{12,13,14} other major drivers derive from types and utilization of care, and from prices paid.¹⁵ In Vermont, levels and rates of growth have been shown to vary by region, or hospital service area (HSA).^{16,17} National studies have indicated that, for hospital care, price increases have been a major driver of health spending growth, around 5-8 percent annually between 2008 and 2012.^{18,19} A recent study of the Vermont commercially insured population found that spending per admission and other services were lower, but grew faster than the national average between 2007 and 2011.²⁰

To manage and control future health spending, it is critical to understand the underlying factors that have contributed to health spending growth over time. In order to identify and target potential areas for policy changes by governing bodies, the broad drivers of spending can be classified as utilization, price, and some measure of intensity and service mix. In this model, the growth in health care costs over time is due to changes in the number of services provided per member (“utilization”), the number of enrollees (“enrollment”) and the allowed payments (“prices”) actually paid for those services.²¹ In addition, there are often changes over time in the number and complexity of services and resources use within a hospital stay. For example, there may be a change in the number and technologic complexity of the diagnostic imaging tests provided during a hospital stay. This is often referred to as a change in

¹² Thorpe KE. Treated disease prevalence and spending per treated case drove most of the growth in health care spending in 1987–2009. *Health Affairs* 2013 32(5):851-858.

¹³ Wallack AR, Kappel SJ, Wallack SS. Health Care Costs and Cost Growth in Vermont: An Analysis of Recent Trends and Explanatory Factors. July 2010.

¹⁴ Herrera C, Gaynor M, Newman D, Town RJ, Parente ST. Trends underlying employer-sponsored health insurance. *Health Affairs* 2013 32(5):851-858.

¹⁵ Health Care Cost Institute. 2012 *Health Care Cost and Utilization Report*. Revised, December 2013. http://www.healthcostinstitute.org/files/2007-2011VermontHCCUR_DecemberRevision%2012-11-14.pdf

¹⁶ Del Trecco M, Zigmann G, Gates T. Vermont Association of Hospitals and Health Systems. *Vermont Health Systems Payment Variation Report, Phase 1 Draft*. June 2013.

¹⁷ Policy Integrity. Drivers of health care spending. <http://policyintegrity.com/Drivers%20of%20Health%20Care%20Spending.pdf>. Accessed February 27, 2014.

¹⁸ Lemieux J and Mulligan T. Trends in inpatient hospital prices, 2008 to 2010. *American Journal of Managed Care* 2013;19(3):e106-e113.

¹⁹ Health Care Cost Institute. 2012 *Health Care Cost and Utilization Report*. September 2013.

²⁰ Health Care Cost Institute, 2007-2011 *Vermont Health Care Cost and Utilization Report*, August 2014.

²¹ Health Care Cost Institute. 2012 *Health Care Cost and Utilization Report*. Washington, D.C.: Health Care Cost Institute;2013.

“intensity.”³ In the case of outpatient and professional services, service mix is used as a combined measure for case-mix and intensity.

The current analysis examines a change in level of health spending, and the portion of health spending growth incurred due to increased payments for services (“price growth”), and the portion due to increased volume of services between 2008 and 2012. This analysis focuses on inpatient hospital care, facility-based outpatient care, and professional services, both inpatient and outpatient.

2.2 Objectives of study/Policy questions

The specific objectives of this study were to address the following policy questions:

- 1) Between 2008 and 2012, for the state and for each region, and for commercial insurers and Medicaid, what is the relative contribution of changes in price, enrollment, utilization, and intensity in Vermont to the increase in:
 - a) Hospital inpatient spending?
 - b) Outpatient facility services spending?
 - c) Physician and other professional services spending?
- 2) What are the relative changes over time in utilization and prices for hospital admission types responsible for the greatest proportion of use and spending?
- 3) How do the above results within Vermont compare to those that have been reported and available for other states and nationally?

3. Methods

The methods used in this study are borrowed from a large base of research on this topic. The basic idea is to examine spending growth related to one factor while holding other factors constant. Using a common set of services, how much do prices rise over time? Holding prices at a baseline level, how much does the mix of services or the conditions change over time in ways that explain overall spending growth?

In examining payment or price changes over time, it is critical to distinguish between payment increases due to a changing set of services within the same nominal categories (sometimes also measured as “intensity”), from that of pure price increases for the same service. For example, the amount spent for an emergency department visit could change if either the payer allows or negotiates a higher price for an identical service, which is pure price, or if the emergency department provides more technically intensive services within a visit. This study uses two complementary methods to identify pure price increases. For inpatient hospital care, national diagnostic related group (DRG) weights were used to decompose a change in resource use over time from that of pure price increase over time. For outpatient and professional services, where standard DRGs are not used, a market basket approach was

used to identify a consistent set of services over time, and price changes were measured for this basket of services. This analysis was conducted differently from that of inpatient care, because there is nothing equivalent to a DRG weight available for all outpatient or professional services. The RVU weight is similar and was suggested as a possible candidate, but it could not be assigned to numerous services within the data. As an alternative, decomposition analyses were conducted by classifying outpatient services into categories and examining how the total number of services grew (the volume component), and how the distribution across categories and the average price per service within category changed over time (the service mix and price components) .

3.1 Data

The primary data source for these analyses is VHCURES, which includes most of the healthcare claims paid on behalf of Vermont residents. VHCURES does not contain claims for the uninsured, estimated during the study years at less than seven percent of the population.²² These files provided essential data elements identifying service settings, services, dates, diagnoses, procedures, payment information, provider identification and characteristics, and commercial plan member enrollment and characteristic information. The current study examines commercial and Medicaid spending.

3.2 Population included

This study focuses on health spending for Medicaid and commercially-covered Vermont residents, as derived from VHCURES monthly enrollment data.²³ Analyses exclude individuals aged 65 or older, or who enrollment files flag as Medicare and Medicaid beneficiaries ("dual eligibles"), because Medicare claims for these individuals were not available for this analysis, to present a full picture of spending for these individuals.

The population in this study includes those individuals enrolled at any month in commercial coverage. Medicaid enrollment includes those individuals with full Medicaid plans each month, excluding from the denominator numbers enrolled in limited benefit programs, because they do not offer comprehensive Medicaid coverage. Catamount health members are excluded from Medicaid enrollment numbers, and are included in the commercial analysis.²⁴ While this study does include claims-based payments to Medicaid and Blueprint for Health primary care providers, it does not include those payments to providers associated with enrollment and care management, and not linked to specific health care service claims. Population is further divided into five market regions, based on utilization patterns (see **Appendix A1**).

3.3 Defining service categories

The following definitions were used to allocate claims to service settings for this analysis:

²² Vermont Department of Financial Regulation and Market Decisions. *2012 Vermont Household Health Insurance Survey: Comprehensive Results*. (http://www.dfr.vermont.gov/sites/default/files/VHHIS_2012_Final_Report.pdf).

²³ As of the date of this analysis, Medicare data were not available.

²⁴ A limited number of remaining Medicaid claims attributable to individuals covered by limited benefit plans remain in the data. These account for less than 0.5 percent of Medicaid spending.

- Inpatient services: Acute care hospital facility charges that were associated with dates identified from hospital inpatient room and board service charge dates. Inpatient services include all institutional claims submitted for dates within the service dates with UB-04 revenue codes from: hospital inpatient facilities, rehabilitation facilities, freestanding birth centers, and critical access hospitals.
- Outpatient facility services: Institutional claims submitted with UB-04 revenue codes, including: hospital outpatient, hospital lab services to non-patients, skilled nursing outpatient, rural clinics, renal dialysis centers, freestanding clinics, outpatient rehab facilities, community mental health centers, federally qualified health centers, clinic/other, outpatient hospice, ambulatory surgery centers, freestanding birthing centers, and critical access hospitals. Home health is not included in this analysis.
- Professional services: Professional bills, CMS 1500 form professional services procedure codes with no facility charges. Includes all professional physician and non-MD services (e.g., physical therapy, occupational therapy).
- Medicaid-specific service codes: Medicaid service codes that have been defined in the outpatient sector as Category of Service (COS) in the set defined by the Green Mountain Care Board's expenditure analysis as Government Health Care Activities (GHCA) have been separated out within professional services.

(See **Appendix A2** for detailed definitions and coding.)

3.4 Measuring expenditures

Expenditures and spending growth were measured using a payment variable constructed from VHCURES reflecting total allowed amounts for a service for commercial and Medicaid services, including payer portion paid and patient out-of-pocket portion.²⁵ This measure includes both the portion of the service paid by the insurer and the portion paid by the patient, and thus is independent of differences in benefit design (e.g., higher or lower deductible amounts).

A specific additional step was used to document spending for each service within Medicaid. In VHCURES, the paid amount for each service within a claim is available in commercial claims, but not Medicaid. As a result, we calculated a proportion of charges for each service (line) within a claim out of the total charges for the entire claim, and then applied the proportion to the total paid amount (for the entire claim) in order to allocate a paid amount to each service provided, or line, within a claim.

²⁵ This variable is comparable to the "allowed amount" in Medicare claims, which is a common measure for analyzing spending.

This analysis was based on primary payer claims for each insurer type (which include the total allowed payments for the service, regardless of who pays). This approach avoids double counting that can occur when both primary and secondary claims bills are included.²⁶

3.6 Analysis

General approach

The analysis examined the following components of health spending growth:

1. *Spending growth due to changes in “price” per unit for the same service over time:* The change in total spending while holding the other factors constant. The controls for inpatient price growth calculations include utilization/volume, case-mix, and intensity. The controls for outpatient and professional services price growth include utilization/volume and service-mix. In other words, we allow relevant payment amounts to vary over time for a standard service or set of services.
2. *Spending growth due to a change in the number of services per enrolled member (e.g., number of admissions in the case of inpatient hospital, or discrete services in the case of outpatient and professional):* The change in total spending for the observed number of services, holding prices, case-mix, and intensity constant for inpatient services, and holding prices and mix of services constant for outpatient and physician services.
3. *Spending growth due to a change in the mix of services provided:*
 - a. *the case mix of care:* The change in total spending for services, holding prices, intensity and the number of services per visit constant, but allowing the distribution of services to change in order to reflect observed usage patterns during the year. This analysis was done only for inpatient services
 - b. *intensity of care:* The change in total spending for services, holding prices, case-mix, and the number of services per visit constant, but allowing the distribution of services to change in order to reflect observed usage patterns during the year. This analysis was done only for inpatient services.
 - c. *the service mix of care:* The change in total spending for services, holding prices and the number of services per person constant, but allowing the distribution of services to change in order to reflect observed usage patterns during the year. This analysis was done only for outpatient and professional services.
4. *Spending growth due to a change in enrollment.* Annual change in enrollment for Medicaid (increasing five percent per year) and commercial (decreasing nearly two percent per year) were

²⁶ The restrictions include: age less than 65; primary payer claims (in VHCURES, useflag =0); and non dually eligible, based on Medicaid flag; enrollee is eligible within the study year, but enrollment is calculated for each month.

included as a driver in measures of total spending, but were not used in the calculation of per member spending.

Total health spending growth is the sum of these four components, with a small portion that is not attributable arithmetically to one particular factor (the “interaction” of all factors). Additional detail on the methodology is provided in the technical appendix (**Appendix B**).

4. Results: Overview of health spending levels and growth by category for commercial and Medicaid covered Vermont residents

Table 1 provides an overview of health spending per member per year growth for commercial and Medicaid insured Vermonters between 2008 and 2012. Commercial insurance has decreased in enrollment nearly two percent annually, while per member spending increased about five percent annually. However, it is important to note that spending has grown more slowly in later years, decreasing from 7.4 percent growth in 2008-2009 to 2.5 percent in 2011-2012. Medicaid enrollment for non-dually eligible beneficiaries under age 65 increased nearly five percent annually over this time, but spending per beneficiary grew more slowly, at 1.7 percent annually. It should be noted that as enrollment increases, per member per year spending growth may be offset by new enrollees that are healthier, or increased by those who are less healthy. For both insurers, hospital spending per member per year has been the fastest growing service, followed by outpatient facility care, in spite of a decreasing rate of inpatient admissions for each payer, detailed in later sections.

Table 1: OVERVIEW OF HEALTH SPENDING LEVELS AND GROWTH FOR THE INSURED POPULATION. Vermont per member per year (PMPY) resident non-prescription drug spending by category, age<65, non-dual eligible in month, commercial and Medicaid, 2008-2012 (Source: VHCURES, Truven extract 201403, primary payer claims)

COMMERCIAL	2008	2009	2010	2011	2012	Ave annual growth
Total member months	3,611,640	3,512,616	3,400,944	3,400,680	3,370,716	-1.7%
Total member years (mm/12)	300,970	292,718	283,412	283,390	280,893	-1.7%
Total allowed \$\$ (x000)	\$1,041,089	\$1,089,997	\$1,109,609	\$1,156,674	\$1,175,930	3.1%
Total PMPY all services	\$3,467	\$3,719	\$3,916	\$4,080	\$4,187	4.8%
Percent change PMPY from prior yr		7.4%	5.1%	4.3%	2.5%	
Hospital acute inpatient facility spending PMPY	\$623	\$673	\$707	\$729	\$791	6.2%
Other inpatient (e.g., skilled nsg, misc room and board)	\$4	\$6	\$8	\$8	\$7	14.2%
Outpatient facility spending PMPY	\$1,511	\$1,664	\$1,786	\$1,879	\$1,936	6.4%
Professional services spending PMPY	\$1,329	\$1,376	\$1,415	\$1,464	\$1,453	2.2%
MEDICAID						
Total member months	1,230,320	1,337,305	1,427,646	1,478,736	1,496,077	5.0%
Total member years (mm/12)	102,527	111,442	118,971	123,228	124,673	5.0%
Total allowed \$\$ (x000)	\$487,193	\$540,860	\$573,334	\$612,202	\$634,585	6.8%
Total PMPY all services	\$4,752	\$4,853	\$4,819	\$4,968	\$5,090	1.7%
Percent change PMPY from prior yr		2.1%	-0.7%	3.1%	2.5%	
Hospital acute inpatient facility spending PMPY	\$624	\$771	\$856	\$945	\$921	10.2%
Other inpatient and outpatient (e.g., skilled nsg, misc room and board)	\$48	\$13	\$38	\$36	\$35	-8.2%
Outpatient facility spending PMPY ^a	\$688	\$676	\$680	\$749	\$799	4.1%
Professional services spending PMPY ^b	\$1,311	\$1,363	\$1,335	\$1,320	\$1,323	0.2%
Government Health Care Activities (GHCA)	\$2,081	\$2,030	\$1,910	\$1,918	\$2,012	-0.8%

^a Medicaid outpatient facility spending totals reflect all allowed payments for the covered population. The total allowed for the analysis of spending drivers in section 6 is lower than the above number, as some services could not be assigned to payment categories necessary for the spending driver analysis.

^b Excludes Medicaid-specific Government Health Care Activities (GHCA) payments

5. Drivers of health spending growth: Acute inpatient stays

5.1 Approach and definitions

Inpatient spending includes the spending on facility services provided to patients, while admitted to acute hospitals (including bill type codes 11, 12, and 85). The inpatient analysis excludes spending on services performed and separately billed by physicians and other professionals, which is included in the professional component of spending drivers. In order to standardize service classification and appropriately measure intensity, all inpatient admissions in all years of the study were assigned by Truven Health Analytics to a diagnosis related group based on diagnoses and procedures, using

methodology similar to that of Medicare.²⁷ DRGs for both commercial and Medicaid admissions were then assigned weights provided by Centers for Medicare and Medicaid services, which are based on standard resource use for each DRG calculated at a national level. This allows for standardization of resource use, and calculation of intensity-adjusted price changes over time. This is further described in the technical appendix (**Appendix B**).

5.2 Context: Hospital acute inpatient care spending levels and admission types

Between 2008 and 2012, the inpatient admission rate for commercially insured residents age <65 decreased slightly from 48.4 to 47.7 per 1000 members per year (**Table 2**), which is lower than a recent estimate of 63 per 1000 for employer sponsored insurance nationally.²⁸ Actual allowed average payments per admission increased from \$12,881 to \$16,584 (6.5% annual growth), and were similar to the national average in 2011.²⁹ Average pure price per admission (payments for similar resource use levels, adjusting for changes in case mix and resource use over time) increased 4.1 percent per year. For both payers, intensity-adjusted spending per admission grew at one-third less than the unadjusted spending growth, meaning that price increased faster than intensity of services.

For Vermont residents covered by Medicaid (non-dually-eligible), the inpatient admission rate for Vermont residents decreased from 96.8 to 90.6 per 1000 members per year. The actual allowed s per admission increased from \$6,447 to \$10,172, or 12.1 percent annually, nearly twice the growth rate of commercial. After adjusting for case mix and intensity, the pure price per admission increased nine percent annually.

Types of admissions differed somewhat for commercial versus Medicaid. **Appendix A3** shows hospital admissions by major diagnostic category (MDC), total spending, and spending per admission for 2012. For commercially insured residents, orthopedic services rank highest in spending for inpatient facility services, followed by circulatory and digestive diagnostic categories. Medicaid's highest inpatient hospital spending was for mental health admissions, which is the lowest inpatient admission category in commercial insurance.

²⁷ Truven Health Analytics Disease Staging Software v 5.26

²⁸ HCCI Vermont Health Care Cost and Utilization Report, December 2014. http://www.healthcostinstitute.org/files/2007-2011VermontHCCUR_DecemberRevision%2012-11-14.pdf

²⁹ HCCI Vermont Health Care Cost and Utilization Report, December 2014. http://www.healthcostinstitute.org/files/2007-2011VermontHCCUR_DecemberRevision%2012-11-14.pdf

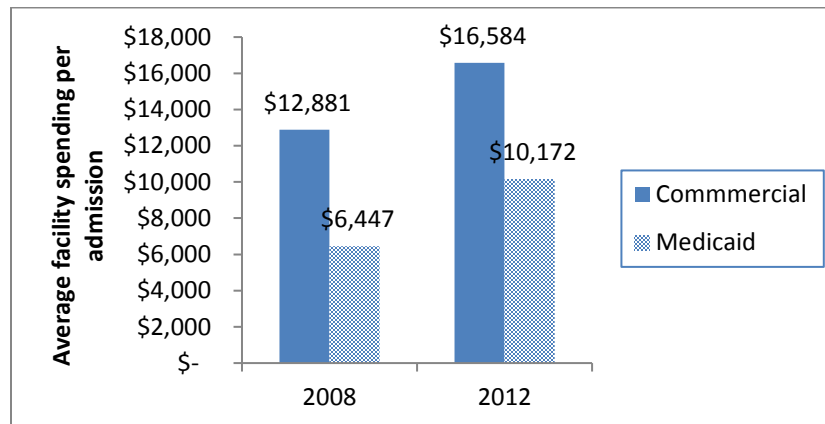
Table 2: OVERVIEW OF INPATIENT HOSPITAL FACILITY SPENDING, VERMONT INSURED RESIDENTS.
Hospital acute inpatient facility utilization and spending (bill type 11/12/85), Vermont residents age <65, non-dual eligible in month, 2008-2012 (source: VHCURES, Truven extract 201403, primary payer claims)

COMMERCIAL	2008	2009	2010	2011	2012	Ave annual growth
Total member years (mm/12)	300,970	292,718	283,412	283,390	280,893	-1.7%
Total allowed (x000)	\$187,449	\$197,062	\$200,422	\$206,528	\$222,255	4.3%
Per member per year	\$623	\$673	\$707	\$729	\$791	6.2%
Total # of admissions	14,533	13,620	13,041	13,121	13,402	-2.0%
Admissions per 1000 members per year	48.4	46.5	46.0	46.3	47.7	-0.3%
Average intensity (DRG weight)	1.22	1.25	1.27	1.28	1.34	2.3%
Allowed unadjusted \$ per admission ^a	\$12,881	\$14,469	\$15,369	\$15,740	\$16,584	6.5%
Intensity adjusted \$ per admission	\$10,561	\$11,547	\$12,106	\$12,256	\$12,419	4.1%
MEDICAID						
Total member years (mm/12)	102,527	111,442	118,971	123,228	124,673	5.0%
Total allowed (x000)	\$63,964	\$85,912	\$101,897	\$116,405	\$114,885	15.8%
Per member per year	\$624	\$774	\$856	\$945	\$921	10.2%
Total number of admissions	9,922	10,696	11,373	11,599	11,294	3.3%
Admissions per 1000 members per year	96.8	96.0	95.6	94.1	90.6	-1.6%
Average intensity weight (DRG weight)	1.13	1.18	1.19	1.24	1.27	2.9%
Allowed unadjusted \$ per admission	\$6,447	\$8,032	\$8,960	\$10,036	\$10,172	12.1%
Intensity adjusted \$ per admission ^a	\$5,723	\$6,822	\$7,530	\$8,079	\$8,039	8.9%

^a Intensity adjusted admission: Spending per admission standardized to a DRG weight of 1.0 for all years, a measure of average price growth adjusted for DRG weight (resource use).

Comparison of Medicaid and commercial spending per admission reveals that over time, between 2008 and 2012, while Medicaid price per admission increased more rapidly than commercial, average admission spending is still lower than commercial. However, the gap has decreased, with Medicaid average per admission going from 50 to 62 percent of average commercial (**Figure 1**).

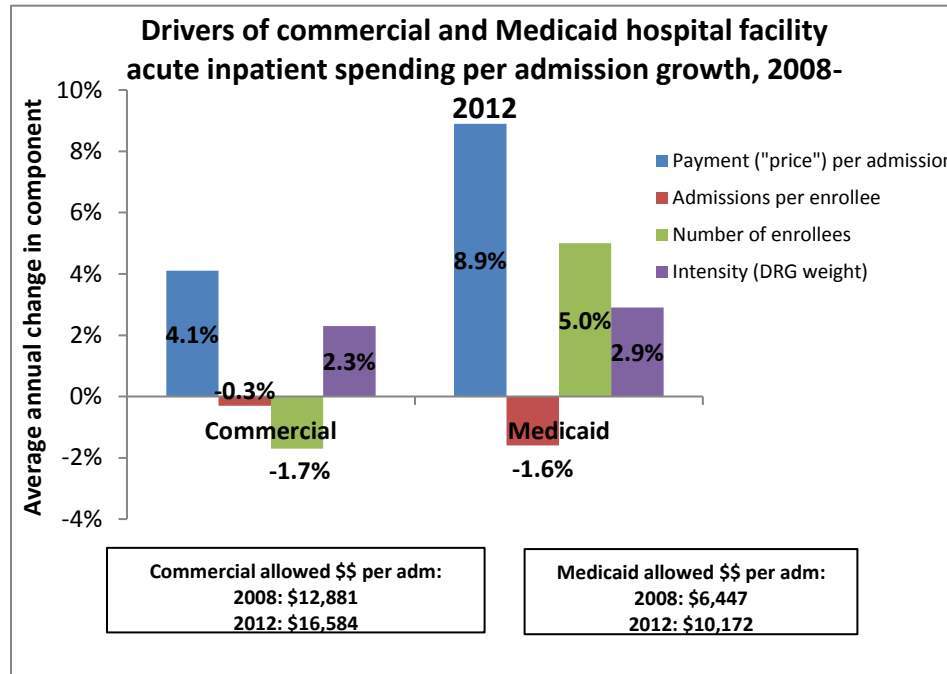
Figure 1: 2008-2012 VERMONT RESIDENT AVERAGE SPENDING PER ADMISSION, COMMERCIAL AND MEDICAID. Vermont Residents age<65, excluding Medicare beneficiaries (Source: VHCURES, Truven extract 201403, primary payer claims)



5.3 Hospital inpatient facility spending growth drivers for Vermont residents

For both commercial and Medicaid, price drove inpatient expenditure growth more than other factors (**Figure 2**). Medicaid payments per admission grew at twice the rate of commercial, but remained at a lower level than commercial by 2012. During this time period, Medicaid reimbursement for acute inpatient care transitioned from per diem to prospective payment DRGs, and effort was made to bring Medicaid inpatient payments closer to that of commercial. Medicaid per member per year adjusted price per admission increased at an annual rate of nearly nine percent, and commercial at four percent. For Medicaid, overall program spending growth was also driven by enrollment, which increased at nearly five percent annually.

Figure 2: INSURED VERMONT RESIDENTS INPATIENT ACUTE CARE SPENDING GROWTH DRIVERS. Hospital acute inpatient facility spending growth drivers, Vermont residents, commercial and Medicaid, age <65, non-dual eligible in month (source: VHCURES, Truven extract 201403, primary payer claims)



5.4 Inpatient hospital spending growth drivers by resident location

Tables 3 (commercial) and 4 (Medicaid) combine hospitals based on geography, grouping residents into five regional market areas, defined in the table.³⁰ There is considerable difference across regions in inpatient admission rates, spending levels, and growth, possibly due to small numbers. For both payers, the only area that is increasing in utilization is the Upper Valley (adjacent to New Hampshire's Dartmouth-Hitchcock Medical Center). Commercial spending per resident for Upper Valley is growing fastest, due to the combination of price, volume and intensity increases. The highest level of spending for commercial and Medicaid admissions, however, is Rutland area residents, with commercial PMPY \$1026 in 2012, compared to the state average of \$791. Interestingly, prices and inpatient spending per resident by St. Johnsbury/Newport residents grew at the slowest rate for commercially insured, and fastest for Medicaid. Although Medicaid pays hospitals a set DRG, the difference in price growth rates for Medicaid by region reflect differences across regions in case mix, as payments for certain DRGs have increased more than others, and to some extent reflect additional payments that are made in addition to the base DRG rate.

³⁰ Work is currently under way under this contract (Task 2, Health analysis populations) that has defined reduced market areas, combining Vermont's health service areas into five regions. The regions (RRs) included here are draft groupings. See Health Analysis Populations Report, January 2015. See Appendix A1 for definitions and populations.

5.5 Inpatient hospital spending growth drivers by state and major hospitals

Tables 5 (commercial) and 6 (Medicaid) show inpatient acute spending for all Vermont residents, by the state where care was received, and by the major hospitals used (University of Vermont Medical Center [UVMMC], and Dartmouth-Hitchcock). Not all hospital business is reflected here, as out of state residents are not included in the data. For commercial payers, Dartmouth-Hitchcock had the most expensive average admission price in each year, but its case mix (resource use) was also the greatest. For Medicaid, this was not the case, as UVMMC admissions were most expensive, though Dartmouth DRG case mix was slightly higher.

An analysis by DRG of Dartmouth-Hitchcock commercial acute admissions compared to those of Vermont hospitals (including UVMMC) indicates that it is the mix of services provided, rather than higher prices per DRG that account for the higher average payment per admission. These analyses indicate that the effect of case-mix on reimbursement is very strong, accounting for a major portion of Dartmouth-Hitchcock's reimbursement differences. With adjustment for case mix (e.g., with respect to DRG classification), a large proportion of the apparent, original commercial cost differential for Dartmouth-Hitchcock disappears. The remaining reimbursement differential (case mix adjusted) varies from \$1,400 in 2011 to \$3,100 to 2012, representing only an 11% to 24% higher payment for Dartmouth-Hitchcock compared with the apparent 100% increase observed in the unadjusted values. A detailed description of this analysis is shown in **Appendix A4**.

University of Vermont Medical Center intensity-adjusted prices increased most rapidly during the period, for both commercial (5.8% annually) and Medicaid (10.3% annually). Excluding Dartmouth-Hitchcock, the prices paid for commercially insured Vermont residents to hospitals outside of Vermont are higher than all categories. For residents going to Dartmouth-Hitchcock, total spending increased the fastest, due to growth in admissions. It should be noted that Vermont residents using hospitals outside of Vermont for acute care are expensive, and for Medicaid in particular, increasing rapidly during this period.

Appendix A5 lists out-of-state hospital use by state residents by state and level of spending, for 2008 to 2012 (pooled). This table excludes Dartmouth-Hitchcock, which is analyzed in Tables 5 and 6. After excluding New Hampshire's Dartmouth-Hitchcock, Massachusetts hospitals provide the most inpatient dollars outside of Vermont, for both commercial and Medicaid.

Table 3: ACUTE INPATIENT FACILITY SPENDING GROWTH DRIVERS BY RESIDENT LOCATION, COMMERCIAL. Hospital acute inpatient facility spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month, by market region (RR)³¹ (source: VHCURES, Truven extract 201403, primary payer claims)

Resident region	2008 unadjusted \$ per adm (# adm) Admits/1000 PMPY	2012 unadjusted \$ per adm (# adm) Admits/1000 PMPY	2008-2012 average annual change in: (change in price +volume+enroll+intensity+interaction=change in total program spending)					
			Payment ("price") per stay	Volume (adm/ enrollee)	Intensity (DRG weight)	Enrollment	Total program inpt.acute spending	Total Inpatient acute spending/ resident
Vermont all commercial insured residents	\$12,881 (14,553) 48.4 \$623	\$16,584 (13,402) 47.7 \$791	4.1%	-0.3%	2.3%	-1.7%	4.3%	6.2%
RR1: Greater Burlington	\$11,689 (6,196) 49.6 \$580	\$15,017 (5,870) 48.9 \$735	4.6%	-0.3%	1.8%	-1.0%	5.0%	6.1%
RR2: Barre area	\$12,013 (2,204) 47.2 \$567	\$14,786 (1,925) 44.8 \$663	3.7%	-1.3%	1.6%	-2.1%	1.8%	4.0%
RR3: St Johnsbury /Newport	\$14,773 (1,058) 48.3 \$713	\$18,418 (866) 42.2 \$778	1.9%	-3.3%	3.6%	-1.6%	0.5%	2.2%
RR4: Upper Valley	\$13,552 (2,490) 41.7 \$564	\$18,469 (2,512) 45.4 \$839	4.0%	2.2%	3.9%	-1.9%	8.3%	10.5%
RR5: Rutland area	\$15,065 (2,605) 54.6 \$822	\$19,426 (2,229) 52.8 \$1026	4.6%	-0.8%	1.9%	-3.0%	2.5%	5.7%

Table 4: ACUTE INPATIENT FACILITY SPENDING GROWTH DRIVERS BY RESIDENT LOCATION, MEDICAID. Hospital acute inpatient facility spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month, by market region (RR)³² (Source: VHCURES, Truven extract 201403, primary payer claims)

³¹ Region 1: Burlington, Middlebury, St. Albans

Region 2: Barre, Morrisville

Region 3: St. Johnsbury, Newport

Region 4: WRJ, Randolph, Brattleboro, Springfield

Resident region	2008 unadjusted \$ per adm (# adm) Admits/1,000 PMPY	2012 unadjusted \$ per adm (# adm) Admits/1,000 PMPY	2008-2012 average annual change in: (change in price +volume+enroll+intensity+interaction= change in total program spending)					
			Payment ("price") per stay	Volume (adm/ enrollee)	Intensity (DRG weight)	Enrollment	Total program inpatient acute spending	Total Inpt. acute spending/ resident
Vermont all Medicaid insured residents	\$6,447 (9,922) 96.8 \$624	\$10,172 (11,294) 90.6 \$921	8.9%	-1.6%	2.9%	5.0%	15.8%	10.2%
RR1: Greater Burlington	\$7,078 (3,233) 92.4 \$654	\$11,700 (3,475) 81.1 \$949	9.1%	-3.2%	3.9%	5.2%	15.5%	9.8%
RR2: Barre area	\$6,721 (1,329) 87.1 \$585	\$11,148 (1,470) 80.1 \$893	10.9%	-2.0%	2.4%	4.7%	16.4%	11.1%
RR3: St Johnsbury /Newport	\$5,797 (1,157) 89.9 \$521	\$11,205 (1,089) 74.3 \$832	13.5%	-4.7%	3.9%	3.3%	16.1%	12.4%
RR4: Upper Valley	\$6,029 (2,008) 104.3 \$603	\$8,622 (2,681) 105.5 \$909	6.3%	1.4%	2.9%	6.1%	17.6%	10.8%
RR5: Rutland area	\$6,075 (2,195) 113.7 \$691	\$8,733 (2,579) 110.3 \$963	7.3%	-0.8%	2.0%	4.9%	14.0%	8.7%

Region 5: Rutland, Bennington

³² Region 1: Burlington, Middlebury, St. Albans

Region 2: Barre, Morrisville

Region 3: St. Johnsbury, Newport

Region 4: WRJ, Randolph, Brattleboro, Springfield

Region 5: Rutland, Bennington

Table 5: ACUTE INPATIENT FACILITY SPENDING GROWTH DRIVERS BY STATE AND MAJOR HOSPITALS, COMMERCIAL. Hospital acute inpatient facility spending growth drivers, Vermont residents, Commercial and Medicaid, age <65, non-dual eligible in month, by location of service (source: VHCURES, Truven extract 201403, primary payer claims)

COMMERCIAL								
Resident region	2008 unadjusted \$ per adm (n adm) Total \$ (x000)	2012 unadjusted \$ per adm (n adm) Total \$ (x000)	2008-2012 average annual change in: (change in price +volume+enroll+intensity+interaction= change in total program spending)					
			Payment ("price") per stay	Volume (adm/enrollee)	Intensity (2012 DRG weight)	Enrollment	Total program inpatient acute fac spending	Total Inpatient acute fac spending/resident
Vermont all residents	\$12,881 (14,553) \$187,457	\$16,584 (13,402) \$222,259	4.1%	-0.3%	2.3% (1.3)	-1.7%	4.4%	6.2%
Vermont residents to all acute care Vermont hospitals (incl. UVMMC)	\$10,595 (11,078) \$117,371	\$13,726 (9,924) \$136,217	4.7%	-1.0%	1.9% (1.2)	-1.7%	3.8%	5.6%
Vermont residents to Dartmouth-Hitchcock Medical Center ^a	\$20,704 (1,811) \$37,495	\$25,479 (1,885) \$48,028	2.6%	2.8%	2.2% (1.8)	-1.7%	6.4%	4.7%
Vermont residents to UVMMC	\$11,523 (5,509) \$63,480	\$15,197 (5,036) \$76,532	5.8%	-0.5%	1.3% (1.4)	-1.7%	4.8%	6.6%
Vermont residents to all other non-Vermont hospitals	\$19,580 (1,664) \$32,581	\$23,859 (1,593) \$38,007	2.9%	0.6%	2.1% (1.4)	-1.7%	3.9%	5.7%

^a Note that higher average payment per admission to Dartmouth-Hitchcock Medical Center is due largely to differences in case mix. See Appendix A4

Table 6: ACUTE INPATIENT FACILITY SPENDING GROWTH DRIVERS BY STATE AND MAJOR HOSPITALS, MEDICAID. Hospital acute inpatient facility spending growth drivers, Vermont residents, Commercial and Medicaid, age <65, non-dual eligible in month, by location of service (source: VHCURES, Truven extract, primary payer claims)

MEDICAID								
Resident region	2008 unadjusted \$ per adm (n adm) Total \$ (x000)	2012 unadjusted \$ per adm (n adm) Total \$ (x000)	2008-2012 average annual change in: (change in price +volume+enroll+intensity+interaction= change in total program spending)					
			Payment ("price") per stay	Volume (adm/enr)	Intensity (2012 DRG weight)	Enrollment	Total program spend	Total spending/ resident
Vermont all residents	\$6,447 (9,922) \$63,963	\$10,172 (11,294) \$114,885	8.9%	-2.5%	2.3% (1.3)	5.0%	15.8%	9.3%
Vermont residents to all Vermont acute care hospitals (incl. UVMMC)	\$6,330 (8,216) \$51,971	\$10,158 (8,783) \$89,220	9.2%	-3.2%	3.0% (1.2)	5.0%	14.5%	9.0%
Vermont residents to Dartmouth-Hitchcock Medical Center	\$6,041 (1,077) \$6,507	\$8,371 (1,394) \$11,669	7.4%	1.6%	1.0% (1.7)	5.0%	15.7%	10.2%
Vermont residents to UVMMC	\$7,398 (2,988) \$22,106	\$12,565 (2,956) \$37,141	10.3%	-5.0%	3.5% (1.5)	5.0%	13.9%	8.4%
Vermont residents to all other hospitals	\$8,639 (635) \$5,486	\$12,530 (1,117) \$13,956	8.1%	9.7%	1.5% (1.4)	5.0%	26.4%	20.4%

6. Drivers of health spending growth: Outpatient facility care

6.1 Approach and definition

The outpatient facility analyses measured the spending for facility services provided outside of inpatient stays. It also includes all services not included in acute hospitalization facility, or inpatient nursing facility bills. This analysis was conducted differently from that of inpatient care, because there is nothing equivalent to a DRG weight available for all outpatient or professional services. The RVU weight is similar and was suggested as a possible candidate, but it could not be assigned to numerous services within the data, particularly Medicaid services. As an alternative, decomposition analyses were conducted by classifying outpatient services into categories and examining how the total number of charged services grew (the volume component), and how the distribution across categories and the average price per service within category changed over time (the service mix and price components). It should be noted that calculation of the price growth component was derived from a “market basket” approach, whereby a fixed distribution across service categories³³ were used to determine the growth in allowed payments over time. Category definitions, utilization, and spending for outpatient facility service categories are detailed in the technical appendix (**Appendix B**).

For Medicaid, not all outpatient services were able to be allocated to appropriate categories for this analysis, so that the total spending per member per year in this section is lower than that noted in Table 1, by approximately \$52 PMPY (or seven percent of total spending).

6.2 Context: Outpatient facility services spending levels and growth

Outpatient facility services per covered resident per year grew at 6.4 percent annually for commercially insured Vermont residents, and 4.1 percent for Medicaid (**Table 7**). For the commercially insured, unadjusted payments per service grew from \$199 to \$244 (5.3% annually), with a slight growth in the number of services per individual. For Medicaid, the base price for services was much lower, with lower growth (2.1% annually). However, price per charged service is not directly comparable across payers, as billing practices may differ between Medicaid and commercial payers.

³³ An obvious feature of this method is that it takes into account a more expensive service substituting for a less expensive service over time (e.g., an MRI, or an even more expensive 3-D MRI, substituting for a scan) as a price effect. Some providers would want this broken out as a separate ‘intensity’ (technology) effect. Our use of broad service categories in the calculation of price and service mix growth rates will equate services that many providers would not want to see made equivalent.

Table 7: OUTPATIENT FACILITY SERVICES SPENDING OVERVIEW, COMMERCIAL AND MEDICAID.
 Outpatient facility utilization and spending, Vermont residents age <65, non-dual eligible in month, 2008-2012 (source: VHCURES, Truven extract 201403, primary payer claims [useflag=0])

COMMERCIAL	2008	2012	Ave. annual growth
Total member years (mm/12)	300,970	280,893	-1.7%
Total allowed (x000)	\$454,650	\$543,865	4.6%
Per member per year	\$1,511	\$1,936	6.4%
Total number of services ^a	2,289,256	2,230,765	-0.6%
Services per member per year	7.6	7.9	1.1%
Allowed \$ per charged service	\$199	\$244	5.3%
MEDICAID			
Total member years (mm/12)	102,527	124,673	5.0%
Total allowed (x000) ^b	\$65,202	\$93,188	9.3%
Per member per year ^b	\$636	\$747	4.1%
Total number of services ^{a,b}	864,955	1,139,160	7.1%
Services per member per year ^b	8.4	9.1	2.0%
Allowed \$ per charged service	\$75	\$82	2.1%

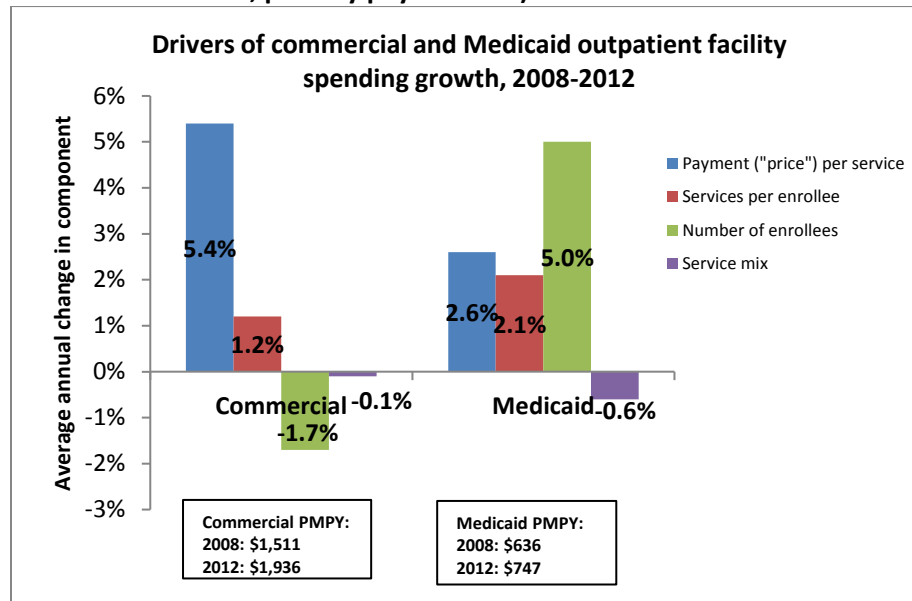
^a Services = individual service lines within a paid claim, not aggregated into "visits"

^b Total Medicaid outpatient facility services and per member per year does not match totals for the population in Table 1, as some Medicaid services were unable to be categorized for the purposes of the decomposition analysis. Total all outpatient facility services spending per member per year (including undefined services) is \$688 in 2008 and \$799 in 2012.

6.3 Outpatient facility spending growth drivers

While price was a major driver of outpatient facility services for both payer types, there were different trends by payer (**Figure 3**). For the commercially insured, price alone drove spending increases, growing by 5.4 percent annually. However, for Medicaid, utilization grew faster than price, which grew 2.6 percent annually during these years. Medicaid utilization per enrollee increased by two percent annually, twice that of commercial.

Figure 3: OUTPATIENT FACILITY SPENDING GROWTH DRIVERS. Outpatient facility spending growth drivers, Vermont residents, commercial and Medicaid, age <65, non-dual eligible in month (source: VHCURES, Truven extract 201403, primary payer claims)



6.4 Vermont outpatient facility spending growth drivers by resident location

Spending growth patterns for outpatient services by resident location differed from that of inpatient (**Table 8**, Commercial and **Table 9**, Medicaid). For commercial payers, average spending per member was highest in St. Johnsbury each year (\$1,857 in 2008 to \$2,410 in 2012), and for Medicaid, Rutland area spending per member was highest (\$657 to \$823). For both payers, Burlington area residents outpatient spending per member per year was lowest at baseline, but prices grew faster than other areas, followed by St Johnsbury/Newport, and for Medicaid, the Barre area as well.

Table 8: OUTPATIENT FACILITY SPENDING GROWTH DRIVERS BY RESIDENT LOCATION, COMMERCIAL. Outpatient facility spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month, by market region (RR)³⁴ (source: VHCURES, Truven extract 201403, primary payer claims)

COMMERCIAL										
Resident region	outpatient facility spending per enrollee		\$ per charged service ^a		2008-2012 average annual PMPY change in: (Allowed + volume + service mix + interaction = total PMPY change)				Average annual total program change (PMPY + enrollment+ interaction)	
	2008	2012	2008	2012	PMPY allowed payments ("price"/ service)	PMPY volume (services/ enrollee)	PMPY service mix	Total spending/ resident on facility svc	Enrollment	Total outpatient facility program spending
Vermont all residents	\$1,511	\$1,936	\$199	\$244	5.4%	1.2%	-0.1%	6.4%	-1.7%	4.6%
RR1: Greater Burlington	\$1,323	\$1,685	\$185	\$239	6.4%	-0.3%	0.1%	6.2%	-1.0%	5.1
RR2: Barre area	\$1,488	\$1,909	\$193	\$230	4.5%	2.1%	0.0%	6.4%	-2.1%	4.2
RR3: St Johnsbury/ Newport	\$1,857	\$2,410	\$214	\$262	5.7%	1.7%	-0.4%	6.7%	-1.6%	5.0
RR4: Upper Valley	\$1,689	\$2,137	\$207	\$251	4.9%	1.1%	0.2%	6.1%	-1.9%	4.0
RR5: Rutland area	\$1,648	\$2,197	\$218	\$252	4.1%	4.0%	-0.2%	7.5%	-3.0%	4.2

^a Services = individual service lines within a paid claim, not aggregated into "visits." Definitions and coding practices for charged services may differ across payers.

³⁴ Region 1: Burlington, Middlebury, St. Albans
 Region 2: Barre, Morrisville
 Region 3: St. Johnsbury, Newport
 Region 4: WRJ, Randolph, Brattleboro, Springfield
 Region 5: Rutland, Bennington

Table 9: OUTPATIENT FACILITY SPENDING GROWTH DRIVERS BY RESIDENT LOCATION, MEDICAID. Outpatient facility spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month, by market region (RR)³⁵ (source: VHCURES, Truven extract 201403, primary payer claims).

MEDICAID										
Resident region	outpatient facility spending per enrollee		\$ per charged service ^a		2008-2012 average annual PMPY change in: (Allowed + volume/enrollee + service mix + interaction = total PMPY change)				Total program spending change (PMPY + enrollment+interaction)	
	2008	2012	2008	2012	Allowed payments ("price"/ service)	Volume (services/ enrollee)	Service mix	Total spending/ resident on facility svc	Enrollment	Total outpatient facility program spending
Vermont all residents ^b	\$636	\$747	\$75	\$82	2.6%	2.1%	-0.6%	4.1%	5.0%	9.3%
RR1: Greater Burlington	\$619	\$724	\$73	\$84	3.8%	0.6%	-0.4%	4.0%	5.2%	9.4%
RR2: Barre area	\$639	\$735	\$80	\$88	2.9%	1.0%	-0.2%	3.6%	4.7%	8.5%
RR3: St Johnsbury/ Newport	\$639	\$715	\$72	\$79	2.9%	0.7%	-0.8%	2.9%	3.3%	6.3%
RR4: Upper Valley	\$641	\$746	\$76	\$76	0.9%	3.9%	-1.0%	3.9%	6.1%	10.1%
RR5: Rutland area	\$657	\$823	\$77	\$82	2.2%	4.5%	-0.7%	5.8%	4.9%	11.0%

^a Services = individual service lines within a paid claim, not aggregated into "visits." Definitions and coding practices for charged services may differ across payers.

^b Total Medicaid outpatient facility services and per member per year does not match totals for the population in Table 1, as some Medicaid services were unable to be categorized for the purposes of the decomposition analysis. Total all outpatient facility services spending per member per year (including undefined services) is \$688 in 2008 and \$799 in 2012.

³⁵ Region 1: Burlington, Middlebury, St. Albans
 Region 2: Barre, Morrisville
 Region 3: St. Johnsbury, Newport
 Region 4: WRJ, Randolph, Brattleboro, Springfield
 Region 5: Rutland, Bennington

6.5 Outpatient facility spending by service category

Categories of services within outpatient facilities were classified according to revenue code type, for use in the decomposition. The contribution of each category to overall spending growth was calculated. For commercial payers (**Table 10**), in addition to the “other” category, radiology services, pharmacy, outpatient surgery were the greatest contributors to spending growth, and for each of these, price was the greatest driver of growth. Price was the greatest spending growth driver for nearly all service categories.

Table 10: OUTPATIENT FACILITY SPENDING BY SERVICE CATEGORY, COMMERCIAL 2008 and 2012.
Outpatient facility spending, Vermont residents, commercial, age <65, non-dual eligible in month
(source: VHCURES, Truven extract 201403, primary payer claims)

COMMERCIAL					
Service Category ^a	Spending on service category per resident per year		Charged services per member per year		Percent Contribution to 2008-2012 PMPY outpatient facility spending increase
	2008	2012	2008	2012	
Dialysis	\$5	\$8	0.0	0.0	0.7%
Durable medical equipment	\$0.16	\$0.21	0.0	0.0	0.0%
Lab/Pathology	\$210	\$270	4.0	4.1	14.2%
Other Ancillary	\$14	\$21	0.0	0.0	1.8%
Other outpatient services ^b	\$268	\$359	0.8	0.8	21.6%
Outpatient surgery	\$259	\$334	0.2	0.2	17.7%
Pharmacy and med/surg supply; packaged services	\$230	\$309	0.9	1.1	18.5%
Professional fees on facility bill ^c	\$66	\$74	0.4	0.3	1.9%
Radiology services ^d	\$417	\$500	1.0	1.0	19.4%
Therapeutic Services	\$43	\$61	0.4	0.4	4.2%
TOTAL All outpatient facility services	\$1511	\$1936	7.6	7.9	100.0%

^a Services = individual service lines within a paid claim, not aggregated into “visits”. Categories based on revenue codes, and may differ across payers due to coding practices.

^b Other outpatient services: e.g., mental health, rehab, unclassified.

^c Professional fees on a facility bill: bills submitted on a UB-04 facility bill, with service diagnosis of professional services.

^d Radiology services: Includes services identified as radiology: all imaging that occurs in a facility submitted with UB-04 revenue codes.

For Medicaid (**Table 11**), the greatest contributors to growth were radiology, outpatient surgery, and pharmacy services (exclusive of outpatient prescription drugs). While price drove spending growth for many services, service mix and other factors contributed as noted in the last column.

Table 11: OUTPATIENT FACILITY SPENDING BY SERVICE CATEGORY, MEDICAID 2008 and 2012.
Outpatient facility spending, Vermont residents, commercial, age <65, non-dual eligible in month
(source: VHCURES, Truven extract 201403, primary payer claims)

MEDICAID					
Service category ^a	Spending on service category per resident per year		Charged services per member per year		Percent Contribution to 2008-2012 PMPY outpatient facility spending increase
	2008	2012	2008	2012	
Dialysis	\$3	\$2	0.0	0.0	-0.9%
Durable medical equipment	\$0.15	\$0.08	0.0	0.0	-0.1%
Lab/Pathology	\$79	\$95	4.3	4.8	13.8%
Other Ancillary	\$8	\$8	0.1	0.1	0.5%
Other outpatient services ^b	\$200	\$218	1.4	1.5	16.1%
Outpatient surgery	\$108	\$136	0.1	0.2	24.6%
Pharmacy and med/surg supply; packaged services	\$82	\$104	1.2	1.4	19.4%
Professional fees on facility bill ^c	\$0.11	\$0.06	0.0	0.0	0.0%
Radiology services ^d	\$129	\$156	1.0	0.9	24.6%
Therapeutic Services	\$26	\$28	0.3	0.4	1.9%
TOTAL All outpatient facility services	\$636	\$747	8.4	9.1	100.0%

^a Services = individual service lines within a paid claim, not aggregated into "visits." Categories based on revenue codes and may differ across payers due to coding practices.

^b Other outpatient services: e.g., mental health, rehab, unclassified

^c Professional fees on a facility bill: bills submitted on a UB-04 facility bill, with service diagnosis of professional services.

^d Radiology services: Includes services identified as radiology: all imaging that occurs in a facility submitted with UB-04 revenue codes.

7. Drivers of health spending growth: Physician and other professional services

7.1 Approach and definitions

Generally, professional services that are reported using healthcare common procedure coding system codes (HCPCs) were categorized using the Berenson-Eggers Type of Service (BETOS) coding system, which was developed primarily for analyzing the growth in Medicare spending.³⁶ For Medicaid services, payment categories are used somewhat differently from commercial carriers, so the distribution of services and definitions differ somewhat from that of commercial payers. So, comparing unit prices across payers is problematic. However, it is still possible to assign a comparable market basket of services within each payer, in order to measure price, utilization, and service mix changes over time. For this analysis, professional services include those provided both in and outside of a hospital admission.

Medicaid has considerable services in categories related to care management and behavioral health. These categories are designated by specific Medicaid coding, and are not directly comparable to commercial codes. Medicaid professional rehabilitative services (HCPCs code H), which includes psychosocial, alcohol and drug abuse counseling, and community-based services, has the highest spending overall for Medicaid professional services. Medicaid code Z-S includes vendors of items such as pharmaceuticals and eyeglasses, also accounting for a large component of spending. Code Z-T includes case management codes and other agency-specific services.

Government Health Care Activities (GHCA) is another category of service for Medicaid, defined by special programs, and may include services that are provided by professionals, such as mental health treatment providers. However, they were categorized separately from other services, as they could not be assigned to specified sub categories of service. They are shown separately in a section that follows. However, it is important to note that because GHCA accounts for a large proportion of Medicaid professional spending, presenting Medicaid professional spending trends without GHCA presents a limited picture of true spending.

7.2 Context: physician and other professional services spending

Table 12 shows professional services utilization and unadjusted spending per service for 2008 and 2012. The lower numbers for commercial insurance again may reflect differences in coding and billing practices, rather than true utilization and price differences at the service level. Spending levels per service are lower for Medicaid than commercial. However, utilization of professional services per enrollee is higher for Medicaid, reflecting potential differences in coding practices, and appears stable for both payer populations. In terms of growth, commercial spending per member per year has increased around two percent annually, with spending per service decreasing slightly for Medicaid.

³⁶ <http://www.cms.gov/Medicare/Coding/HCPCSReleaseCodeSets/BETOS.html>

Table 12: PROFESSIONAL SERVICES UTILIZATION AND SPENDING OVERVIEW. Professional services utilization and spending, Vermont residents age <65, non-dual eligible in month, 2008-2012 (source: VHCURES, Truven extract 201403, primary payer claims [useflag=0])

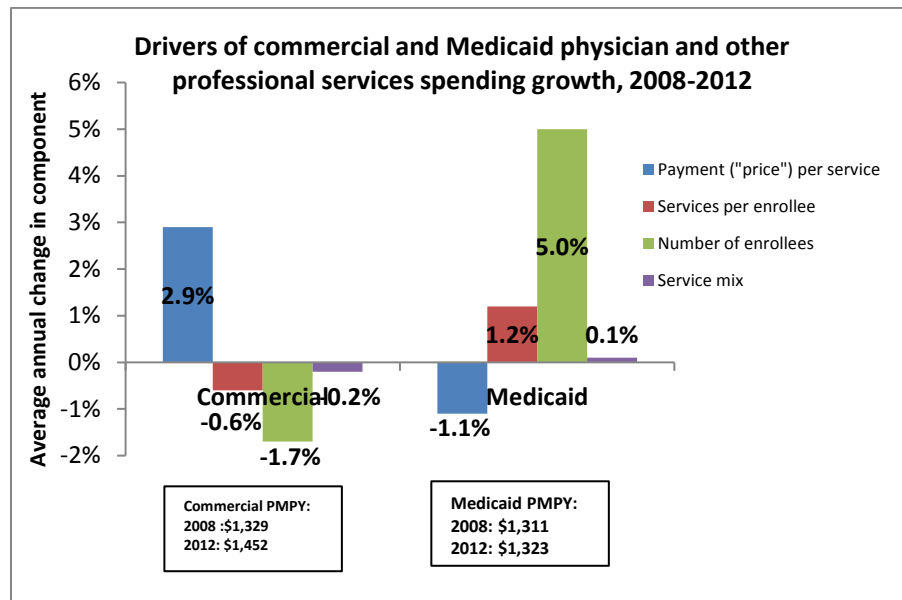
COMMERCIAL	2008	2012	Ave annual growth
Total member years (mm/12)	300,970	280,893	-1.7%
Total allowed (x000)	\$399,982	\$408,012	0.5%
Spending per member per year	\$1329	\$1,453	2.2%
Services per member per year ^a	15.1	14.8	-0.5%
Allowed \$ per charged service	\$88	\$98	2.2%
MEDICAID			
Total member years (mm/12)	102,527	124,673	5.0%
Total allowed (x000)	\$134,435	\$164,882	5.2%
Spending per member per year	\$1,311	\$1,323	-0.2%
Services per member per year ^a	18.6	19.5	-1.2%
Allowed \$ per charged service	\$70	\$68	-1.0%

^a Services = individual service lines within a claim, not aggregated into "visits"

7.3 Vermont physician and other professional services spending growth drivers

For professional services, total spending per member growth was slow for commercial (2.2 percent annually), with Medicaid increasing by 5.2 percent (**Figure 4**). Per member per year spending for commercial increased by 2.2 percent, and remained stable for Medicaid (0.2%). For commercial payers, price was the only factor contributing to spending increase in professional services. For Medicaid, professional services remained stable, with a slight decrease in pure price per service.

Figure 4: PROFESSIONAL SERVICES SPENDING GROWTH DRIVERS. Professional services spending growth drivers, Vermont residents, commercial and Medicaid, age <65, non-dual eligible in month (source: VHCURES, Truven extract 201403, primary payer claims)



7.4 Vermont physician and other professional services spending growth drivers by resident location

Table 13 (commercial) and **Table 14** (Medicaid) show professional services spending by resident location. For commercial insurance, volume per enrollee was quite flat across all regions, and prices increased most rapidly for greater Burlington and Upper Valley residents (3.6 and 3.4 percent annually). However, price increases led to overall increased spending per member per year.

For Medicaid (**Table 14**), professional services per resident were similar to that of commercial at baseline (\$1,311 versus \$1,329), but spending was relatively stable for Medicaid (compared to 2-3 percent growth per year for commercial). Medicaid spending per covered resident grew slightly across all regions, ranging from -1.1 percent annually in greater Burlington to 2.2 percent in the Upper Valley area. As Medicaid has standard fees, average prices varied only slightly, due to differences across regions in services used. Differences in total spending growth for Medicaid professional services across regions were mostly all due to differences in enrollment growth during the study period.

Table 13: PROFESSIONAL SERVICES GROWTH DRIVERS BY RESIDENT LOCATION, COMMERCIAL. Professional services (inpatient and outpatient) spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month, by market region (RR)³⁷ (source: VHCURES, Truven extract 201403, primary payer claims).

COMMERCIAL										
Resident region	Professional services spending per enrollee		\$ per service ^a		2008-2012 average annual PMPY change in: (Allowed + volume/enr + service mix + interaction = total PMPY change)				Average annual total program change (PMPY + enrollment+ interaction)	
	2008	2012	2008	2012	Allowed payments ("price") per service	Volume (services/enrollee)	Service mix	Total spending per resident	Enrollment	Total prof program spending
Vermont all residents	\$1,329	\$1,452	\$88	\$98	2.9%	-0.6%	-0.2%	2.2%	-1.7%	0.5%
RR1: Greater Burlington	\$1,450	\$1,624	\$87	\$100	3.6%	-0.5%	-0.3%	2.9%	-1.0%	1.8%
RR2: Barre area	\$1,232	\$1,338	\$87	\$94	2.3%	0.0%	-0.2%	2.1%	-2.1%	0.0%
RR3: St Johnsbury/ Newport	\$1,100	\$1,195	\$92	\$101	1.8%	-0.4%	0.6%	2.1%	-1.6%	0.4%
RR4: Upper Valley	\$1,195	\$1,335	\$90	\$102	3.4%	-0.5%	-0.2%	2.8%	-1.9%	0.8%
RR5: Rutland area	\$1,247	\$1,330	\$89	\$93	0.8%	0.6%	0.3%	1.6%	-3.0%	-1.5%

^a Services = individual service lines within a claim, not aggregated into "visits"

³⁷ Region 1: Burlington, Middlebury, St. Albans
Region 2: Barre, Morrisville
Region 3: St. Johnsbury, Newport
Region 4: WRJ, Randolph, Brattleboro, Springfield
Region 5: Rutland, Bennington

Table 14: PROFESSIONAL SERVICES GROWTH DRIVERS BY RESIDENT LOCATION, MEDICAID. Professional services (inpatient and outpatient) spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month, by market region (RR)³⁸ (source: VHCURES, Truven extract 201403, primary payer claims). Excludes Government Health Care Activities (GHCA)

MEDICAID										
Resident region	Professional services spending per enrollee		\$ per service ^a		2008-2012 average annual PMPY change in: (Allowed + volume/enr + service mix + interaction = total PMPY change)				Average annual total program change (PMPY + enrollment + interaction)	
	2008	2012	2008	2012	Allowed payments ("price") per service	Volume (services/enrollee)	Service mix	Total spending per resident	Enrollment	Total professional program spending
Vermont all residents	\$1,311	\$1,323	\$70	\$68	-1.1%	1.2%	0.1%	0.2%	5.0%	5.2%
RR1: Greater Burlington	\$1,433	\$1,371	\$72	\$65	-2.0%	1.3%	-0.5%	-1.1%	5.2%	4.0%
RR2: Barre area	\$1,284	\$1,325	\$70	\$68	-0.8%	1.4%	0.1%	0.8%	4.7%	5.6%
RR3: St Johnsbury/ Newport	\$1,199	\$1,199	\$70	\$70	0.4%	-0.2%	-0.2%	0.0%	3.3%	3.3%
RR4: Upper Valley	\$1,157	\$1,263	\$70	\$72	-0.3%	1.5%	1.1%	2.2%	6.1%	8.4%
RR5: Rutland area	\$1,347	\$1,374	\$70	\$67	-2.1%	1.3%	1.1%	0.5%	4.9%	5.4%

^a Services = individual service lines within a claim, not aggregated into "visits"

³⁸ Region 1: Burlington, Middlebury, St. Albans
Region 2: Barre, Morrisville
Region 3: St. Johnsbury, Newport
Region 4: WRJ, Randolph, Brattleboro, Springfield
Region 5: Rutland, Bennington

7.5 Vermont physician and other professional services spending by type of service

Similar to the analysis of outpatient services, professional services were classified into service categories based on BETOS codes, and then examined to determine the relative contribution of each to overall per member per year spending growth. For commercial payers, the greatest contributors were evaluation and management, and procedures, both mostly driven by price increases (for commercial, a changing service mix also contributed), rather than utilization.

Table 15: PROFESSIONAL SERVICES SPENDING BY SERVICE CATEGORY: Commercial professional services spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month (source: VHCURES, Truven extract 201403, primary payer claims)

COMMERCIAL PROFESSIONAL SERVICES SPENDING (INPATIENT AND OUTPATIENT)					
Service type ^a	Spending PMPY on service type		Services per member per year		Percent Contribution to 2008-2012 PMPY professional spending increase
	2008	2012	2008	2012	
Durable medical equipment	\$32	\$41	0.3	0.3	7.0%
Imaging	\$133	\$112	1.5	1.2	-16.2%
Evaluation and management	\$493	\$577	5.6	5.7	67.6%
Other outpatient services ^b	\$121	\$112	2.2	1.9	-7.4%
Procedures	\$442	\$489	2.9	2.7	38.3%
Tests	\$81	\$95	2.4	2.5	12.1%
Other (Y) ^c	\$10	\$9	0.1	0.2	-0.7%
Other (Z) ^d	\$17	\$17	0.1	0.1	-0.6%
Total all professional services	\$1,329	\$1,452	15.1	14.8	100.0%

^a Categories based on Berenson-Eggers Type of Service (BETOS) codes. Services = individual service lines within a paid claim, not aggregated into "visits"

^b Other outpatient services: e.g., vision, hearing, speech services, ambulance, chemotherapy

^c Other Y: Additional Medicaid fee schedules, for various services, and categorized as BETOS CODE Y.

^d Other Z: Local or undefined codes.

Table 16: PROFESSIONAL SERVICES SPENDING BY SERVICE CATEGORY, MEDICAID. Professional services spending growth drivers, Vermont residents, commercial, age <65, non-dual eligible in month (source: VHCURES, Truven extract 201403, primary payer claims)

MEDICAID PROFESSIONAL SERVICES SPENDING (INPATIENT AND OUTPATIENT)					
Service type ^a	spending PMPY on service		Services per member per year		Percent Contribution to 2008-2012 PMPY professional spending increase ^b
	2008	2012	2008	2012	
Durable medical equipment	\$54	\$54	0.5	0.6	0
Imaging	\$58	\$33	1.3	1.2	-
Evaluation and management	\$496	\$512	7.6	7.7	+
Other outpatient services ^c	\$45	\$61	1.2	1.3	+
Procedures	\$144	\$146	1.5	1.5	+
Tests	\$78	\$70	2.1	2.8	-
Other (Y) ^d	\$175	\$161	3.0	2.8	-
Other (Z) ^e	\$260	\$283	1.5	1.7	+
Total all professional services	\$1,311	\$1,323	0.5	0.6	0

^a Categories based on Berenson-Eggers Type of Service (BETOS) codes. Services = individual service lines within a paid claim, not aggregated into "visits"

^b With no increase in spending, calculation of relative contribution of individual services is not meaningful. Direction of contribution is listed as either +, -, or 0

^c Other outpatient services: e.g., vision, hearing, speech services, ambulance, chemotherapy

^d Other Y: Fee schedules

^e Other Z: Local or undefined codes

Substitution of professional for facility services

When viewed together, professional services and outpatient services reveal an important pattern, indicating that many services formerly billed through providers are now provided within hospital outpatient settings. First, there has been a growth in institutional bill categories overall, with decreasing use of professional bill type. Additionally, for major categories, such as imaging and radiology, there is a decrease in professional services that are independent of facilities, and a greater increase in facility-based payments for the service. This finding warrants further examination of what specific services are changing locations over time, and how this affects pricing.

8. Government Health Care Activities

Government Health Care Activities (GHCA) comprise a category of Medicaid-specific services, that do not directly correspond to the common categories included in commercial outpatient or professional services. These services are identified in the VHCURES data as a subset defined by the variable Category of Service (COS) which have historically been defined as GHCA spending in Vermont's expenditure

analysis, These include such services as mental health and substance abuse treatment services, transportation, home health care services and community based care.

Because GHCA services are less well defined than other more standardized services, they are not necessarily standardized across years. As well, quantifying utilization for GHCA services is not straightforward. Therefore, GHCA services do not support the type of decomposition analyses in this report, which isolate the change in price per service over time. However, the following table presents the dollars and utilization for GHCA over time, to provide an overview of total spending and changes in utilization for Vermont Medicaid beneficiaries under age 65, non-dually eligible.

Table 17: MEDICAID GOVERNMENT HEALTH CARE ACTIVITIES UTILIZATION AND SPENDING OVERVIEW. Vermont residents age <65, non-dual eligible in month, 2008-2012 (source: VHCURES, Truven extract 201403, primary payer claims [useflag=0])

MEDICAID GOVERNMENT HEALTH CARE ACTIVITIES	2008	2012	Ave annual growth
Total member years (mm/12)	102,527	124,673	5.0%
Total allowed (x000)	\$213,298	\$250,948	4.1%
Per member per year	\$2,080	\$2,013	-0.8%

9. Summary of Findings

For the population studied, between 2008 and 2012, there was an increase in Medicaid covered lives (5.0 percent annually), and a decrease in commercially covered lives (1.7 percent annually). Price (allowed payments) was a significant driver of expenditure growth for all services and both payers.

For hospital acute inpatient facility spending statewide, for both commercial and Medicaid, price drove inpatient spending growth, and more than made up for any decreases in hospitalization rates for the payers. Price per admission increased at an annual rate of 4.1 percent per member per year for commercially insured and nine percent for Medicaid. Although admission rates decreased for both payers, total per member spending for acute hospitals stays increased, due to rising cost per admission.

Inpatient price growth for commercial payers in this analysis was consistent with or lower than studies of inpatient commercial growth drivers where available (around five percent annually between 2008 and 2010).³⁹ While Medicaid inpatient facility spending grew faster than commercial, as of 2012, the average payment per admission was still lower on average than commercial, even adjusting for intensity and case mix.

For outpatient facility services, growth in volume per enrollee was low for both payers across payers (one percent annually for Medicaid, and two percent for commercial), but prices for commercially insured increased at twice the rate of that of Medicaid (5.4% vs. 2.6%). Price drove commercial

³⁹ Lemieux J and Mulligan T. Trends in inpatient hospital prices, 2008 to 2010. *American Journal of Managed Care* 2013;19(3):e106-e113

spending on outpatient facility services much more than for Medicaid. Although Medicaid level of payments per service were lower than commercial throughout the period, commercial and Medicaid are not directly comparable, as the services in the market basket differ across payer.

For professional services, for both payers, per member per year spending was relatively flat, increasing only 2.2 percent annually for commercial services. Price drove the commercial per member increase. As with outpatient facility spending, it is not possible to directly compare professional services between commercial and Medicaid due to differences in billing practices, as some services included in commercial professional services may be billed by Medicaid through the category Government Health Care Activities (GHCA), which combines social services professionals and mental health service professional services. GHCA accounts for the majority of Medicaid per member professional spending. Therefore, observed patterns in Medicaid professional services may reflect only a portion of Medicaid spending for professionals. GHCA spending per member per year in this category was relatively stable between 2008 and 2012 for the population included in this report (it excludes the dually eligible Medicare/Medicaid population).

Finally, based on the observed billing trends and patterns, there was a shift away from stand-alone outpatient professional services toward more facility-based outpatient services. One example is the diagnostic imaging category, which has decreased on the professional side for commercial insurance from \$133 to \$112 PMPY, while increasing on the facility side from \$417 to \$500 PMPY. For Medicaid, diagnostic imaging decreased as a professional service from \$58 to \$33 PMPY, and increased as a facility service, from \$129 to \$156 PMPY. Radiology services contributed over 24 percent of the Medicaid spending growth for outpatient facility services.

10. Conclusions /Recommendations

From 2008 to 2012, increases in facility payments per service or per hospital stay for Vermont residents, in all regions, more than offset any volume decrease. There were variations in patterns across region, payer, and hospital, with certain regions experiencing consistently higher spending and spending growth, even after adjusting for intensity of care. Out-of-state hospital use is also increasing, especially for Medicaid, with out of state admissions increasing from 6.4 percent of all admissions in 2008 to 10 percent in 2012. Spending per beneficiary per year for these admissions increased over 20 percent between 2008 and 2012. These admissions are on average more expensive than Vermont hospitals. These payment and utilization patterns can inform future considerations in the design of alternative payment models and the design of remaining fee-for-service contracting over time.

Outpatient and professional-related services have experienced a change in setting over time, toward increasing use of facility-based radiology, pharmacy, and outpatient surgery, and slower growth in these services at non-hospital based offices. This parallels national trends as providers have consolidated within hospital or healthcare systems. It is also consistent with national trends toward higher prices related to hospital facility-based services versus outpatient professional offices.⁴⁰ This is also consistent

⁴⁰ Reschovsky JD, White C. Location, location, location: Hospital outpatient prices much higher than community settings for identical services. National Institute for Health Care Reform Issue Brief no.16, June 2014 (<http://www.nihcr.org/Hospital-Outpatient-Prices>).

with the results of the recent Vermont Price Variation Study,⁴¹ which provides a snapshot at a point in time (2011). However, further examination using VHCURES can be conducted to reveal which services are most responsible for this trend over time, and how this impacts payments for particular services. This report should guide policy makers and providers to identify efficient, high quality, providers for these services, and move toward payment rates that support such providers and payments. A longer term issue to consider is the concept of ownership and service site in reimbursement policy.

Recommendations:

This study focuses on drivers of spending growth over time. It should be considered within the context of other studies recently conducted for the Green Mountain Care Board that provide a snapshot in time of price variation across services. For instance, while price variation is the result of historic patterns, it is important to consider baseline differences in spending, and the services that have been growing fastest, and locations with the highest spending increases in recent years. The considerable differences across location in Vermont resident health spending growth should be reviewed, particularly price differences over time for the most expensive areas.

Because this study is largely resident-based (rather than provider-based), the wide variation in spending and growth over time by resident location cannot be solely attributed directly to certain providers. This study does not show where patients receive care, so for most part, results do not indicate how pricing is changing for individual facilities, (with the exception of Dartmouth-Hitchcock and University of Vermont Medical Center (UVMHC) in the inpatient analysis). The market analysis study being conducted at present will fill in this gap, by indicating where patients in each market area receive care, and associated costs. Future research should examine where patients in each market area receive care.

Because Medicare data were not available for this study, spending growth patterns for nearly half of hospital admissions were not analyzed. Nor were patterns for dually eligible beneficiaries analyzed, who are some of the highest cost residents. It is important to extend this analysis to Medicare and dually eligible beneficiaries, in order to better understand how commercial and Medicaid spending has changed within the context of Medicare payment changes over time, including looking at evidence of cost-shifting.

Particular additional findings may warrant further analysis and discussion. This includes:

- The rapid growth in price per admission for Medicaid beneficiaries may be the result of policies directed toward improving reimbursement to more closely align with commercial rates, and during this time, Medicaid inpatient payment moved toward a prospective payment DRG system. This analysis informs the extent to which Medicaid hospital payments are still lower than commercial. In addition, the differences in patterns of use for Medicaid beneficiaries across locations may warrant further examination.

⁴¹ *Price Variation Analysis*, Prepared for the Green Mountain Care Board, August 2014.

- Upper Valley is the only region that is increasing in inpatient utilization per member for the commercially insured population, and is among the regions with highest spending per admission (though low PMPY rates, indicating fewer admissions per resident). Similarly, Dartmouth-Hitchcock shows the highest inpatient utilization growth.
- At the same time, a different pattern emerges for Medicaid. Admissions for Vermont Medicaid beneficiaries to Dartmouth-Hitchcock, even restricted to residents of Upper Valley, are not increasing. This may be due to the Medicaid population not being as mobile or willing to go out-of-state for inpatient care, or perhaps because Medicaid reimbursements are lower than commercial and Dartmouth-Hitchcock has somehow discouraged Vermont Medicaid patients from using it for their inpatient treatment. Further analysis of this detail should inform strategies to provide patient care at the lowest price, high quality, providers.

Health Spending Growth Drivers in Vermont, Medicaid and Commercial Insured, 2008-2012

Appendix A: Supplemental Tables

- 1. Population table: Specifications for selection of the population for analysis**
- 2. Definitions and coding**
- 3. Major diagnostic categories for hospital stays by payer**
- 4. Analysis of Dartmouth-Hitchcock average admission payments compared to Vermont hospitals**
- 5. States and hospitals with highest inpatient acute spending, 2012**

1. Population table: Specifications for selection of the population for analysis

Population	Specifications	2008 enrollment, member months/12	2012 enrollment, member months/12
Commercial	year-dobyr < 65 med_comm_useflag=0 med_mdcd_dual_cov_flag ne 1 ZipSt = 'VT' f_BHpayerID ne 1 <i>* f_BHpayerID =1 for behavioral health carveout plans: * MED_PAYERID in (1061,1221,1251,1278);</i>	300,970	280,893
All Medicaid (including partial Medicaid coverage/ Catamount)	year-dobyr < 65 med_mdcd_useflag=0 med_mdcd_dual_cov_flag ne 1 ZipST = 'VT'	110,818	139,506
Medicaid full coverage beneficiaries	year-dobyr < 65 med_mdcd_useflag=0 med_mdcd_dual_cov_flag ne 1 med_mdcd_full_cov_flag eq 1 ZipST = 'VT'	102,527	124,673
Revised Market Region (RR) definitions and populations		Commercial enrollment 2008 / 2012	Medicaid enrollment 2008 / 2012
RR1:Greater Burlington	Burlington, Middlebury, St. Albans	124,946 / 119,946	35,006 / 42,846
RR2: Barre area	Barre, Morrisville	46,671 / 42,953	15,262 / 18,361
RR3: St.Johnsbury/Newport	St/ Johnsbury/Newport	21,907 / 20,514	12,863 / 14,666
RR4: Upper Valley	White River Junction, Randolph, Brattleboro, Springfield	59,732 / 55,281	20,091 / 25,417
RR5: Rutland area	Rutland, Bennington	47,733 / 42,199	19,306 / 23,382

2. Definitions and coding

Service	Definition	
Inpatient acute stay	Institutional inpatient hospital claims (bill type 11, 12, 85). The admission and discharge dates were assigned by Truven from the claim's room and board revenue code (0100-0179, 020-0219, 0721-0724) service dates.	
Inpatient other stay	Institutional inpatient hospital or facility claims including room and board, that are not acute as defined above. Includes skilled nursing and other non-acute settings.	
Professional services	Professional bills, CMS 1500 form professional services procedure codes, no facility charges. Includes all professional physician and non-MD services (e.g., physical therapy, occupational therapy).	
Outpatient facility	Outpatient Detail institutional claims submitted by rural clinics (bill type 71) , renal dialysis centers (72), outpatient rehab facilities (74), CORFs (75), CMHCs (76), FQHCs (77), hospice facilities (81-82), and critical access hospitals (85). Note: Inpatient Service (VTS) claims were summarized as IP, LTC, PAC, or Home Health.	
Outpatient service categories	<u>UB-04 form rev codes</u> Dialysis DME Lab/Pathology Other ancillary Other outpatient services Outpatient surgery Pharmacy and medical supply Professional fees Radiology services Therapeutic services	820-859 290-299 300-319 900-929 All other 360-369; 481;490;499;790 250-259;262;270-279;343-344;621-633;636-637; 960-988 320-342;349-359;400-409;610-619; 420-449;940-952
Government Health Care Activities (GHCA) (Medicaid only)	Category of service = GHCA	

3. Major diagnostic categories for Vermont resident age <65, non-dual-eligibles, inpatient admissions, 2012 (Source: VHCURES, Truven extract)

Commercially insured Vermont residents, acute hospital stays, major diagnostic category (MDC) Ranking by total spending (COMMERCIAL, 2012)				
Major Diagnostic Category (MDC)	# Stays	Spending/stay	Mean DRG Weight	Total spending
Musculoskeletal & Connective Tissue	1495	\$29,790	2.1	\$44,536,531
Circulatory	1056	\$27,696	2.1	\$29,246,696
Digestive	1174	\$19,000	1.6	\$22,305,496
Pregnancy, Childbirth & Puerperium	2727	\$7,520	0.7	\$20,507,089
Nervous System	593	\$31,532	1.9	\$18,698,574
Respiratory	751	\$18,296	1.5	\$13,740,556
Newborns & Other Neonates	1967	\$5,524	1.0	\$10,865,023
Hepatobiliary & Pancreas	387	\$21,792	1.6	\$8,433,510
Myeloproliferative D&D	195	\$43,119	2.4	\$8,408,154
Infectious & Parasitic Diseases	285	\$25,447	1.9	\$7,252,297
Mental D&D	577	\$10,829	0.9	\$6,248,280

Medicaid covered Vermont residents, acute hospital stays, major diagnostic category (MDC) Ranking by Total Spending (MEDICAID, 2012)				
MDC	# Stays	Spending/stay	Mean DRG Weight	Total spending
Mental Disease and disorder (D&D)	1438	\$15,385	0.9	\$22,123,878
Newborns & Other Neonates	1779	\$9,668	1.6	\$17,199,769
Pregnancy, Childbirth & Puerperium	2110	\$6,469	0.7	\$13,649,301
Respiratory	849	\$11,144	1.5	\$9,461,256
Musculoskeletal & Connective Tissue	595	\$14,476	2.1	\$8,613,304
Circulatory	594	\$12,711	1.9	\$7,550,455
Digestive	699	\$10,517	1.4	\$7,351,092
Nervous System	430	\$11,782	1.7	\$5,066,360
Infectious & Parasitic Diseases	225	\$15,437	1.9	\$3,473,217
Hepatobiliary & Pancreas	332	\$9,369	1.3	\$3,110,447
Alcohol/Drug Use & Disorders	665	\$4,480	0.7	\$2,979,032

4. The Dartmouth-Hitchcock Cost Effect: How much different are Vermont's commercial reimbursements for stays at the Dartmouth-Hitchcock Medical Center?

An important finding in the inpatient decomposition analysis for Vermont is that commercial carriers reimburse the Dartmouth-Hitchcock Medical Center at a much higher 'per stay' level than Vermont hospitals. This is true even compared with the reimbursements to the University of Vermont Medical Center, which like Dartmouth-Hitchcock is associated with a medical school. **Table 4a** shows calculations of these mean reimbursements by year:

Table 4a: Unadjusted mean inpatient reimbursements per stay for Vermont residents – Commercial

Hospital	2008	2009	2010	2011	2012
Dartmouth-Hitchcock	\$20,711	\$23,078	\$23,954	\$21,621	\$25,428
All Vermont Hospitals	\$10,606	\$12,054	\$12,674	\$13,223	\$13,759
University of Vermont Med Center	\$11,525	\$13,098	\$13,807	\$14,887	\$15,201
Other Vermont	\$9,697	\$10,943	\$11,598	\$11,607	\$12,288

While overall reimbursement differences between Dartmouth-Hitchcock and the Vermont hospitals are large, they do not by themselves indicate actual differences commercial carriers pay for the same service at Dartmouth-Hitchcock. Some or perhaps even a large proportion of the 'per stay' reimbursement differences between Dartmouth-Hitchcock and Vermont hospitals could be due to differences in the types of stays or what is referred to as 'case-mix' differences. If so, Dartmouth-Hitchcock reimbursement for comparable patients could be far closer to Vermont hospitals than comparisons of overall means would suggest.

To analyze how much of observed differences in mean reimbursements are really due to price instead of case-mix, we analyze in more detail the 2008-2012 commercial hospital claims of Vermont residents. To undertake this case-mix adjustment, all hospital stays of Vermont residents were classified into a set of consistent DRG categories, based on primary and secondary diagnoses, and in some cases procedures. Following this, we determined the distribution of hospital stays each year among DRG categories, and the corresponding average payment per stay of Dartmouth Hitchcock and Vermont hospitals, if their patients had had this DRG distribution. The differences between Dartmouth Hitchcock's DRG adjusted payment per admission for such a patient load and the matching payment per admission across Vermont hospitals determines how much of Dartmouth-Hitchcock's higher commercial reimbursement is actually due to price, and how much disappears when this case-mix adjustment is applied. **Table 4b** provides the results of these analyses:

Table 4b: Dartmouth Hitchcock adjusted mean inpatient reimbursements per stay for Vermont residents – Commercial

Hospital	2008	2009	2010	2011	2012
Dartmouth-Hitchcock (DRG mix adjusted payment per admission)	\$13,441	\$14,965	\$14,768	\$14,610	\$16,803
All Vermont Hospitals (DRG mix adjusted payment per admission)	\$10,606	\$12,054	\$12,674	\$13,223	\$13,759

Results of these analyses indicate that the effect of case-mix on reimbursement is very strong, accounting for a major portion of Dartmouth-Hitchcock's reimbursement differences. With adjustment for case mix (e.g., with respect to DRG classification), a large proportion of the apparent, original commercial cost differential for Dartmouth-Hitchcock disappears. The remaining reimbursement differential (case mix adjusted) represents only an 11% to 24% higher payment for Dartmouth-Hitchcock compared with the apparent 100% increase observed in the unadjusted values.

Examining Dartmouth-Hitchcock's commercial reimbursements further, we identify two important factors beyond price, which contribute to its higher unadjusted cost per stay (**Table 4c**). The first is Dartmouth-Hitchcock's disproportionately high representation of certain expensive DRGs. This disproportionate representation is likely to increase Dartmouth-Hitchcock's overall mean reimbursement regardless of whether Dartmouth-Hitchcock's cost for these expensive DRGs is greater than Vermont hospitals' or not. Table 3 shows a sample of these expensive DRGs and a calculation of how much each one raises the overall mean reimbursement as a result (provided in the rightmost column labeled 'Cost Effect'). The DRG generating the largest effect is 470 (major joint replacement). Dartmouth-Hitchcock's disproportionate representation of DRG 470 increases its mean reimbursement by \$636 above what it would have been, if DRG 470's representation were the same as at Vermont hospitals.⁴²

Table 4c: The effect of over-representation of expensive DRGs on Dartmouth-Hitchcock mean reimbursement per stay

DRG	DHMC reimbursement	% of DHMC stays	% of Vt stays	Cost Effect
470 - major joint replacement	\$24,144	9.3%	4.4%	\$636
251 - PCTA w/o stent w/o mcc	\$26,318	3.6%	1.4%	\$408
009 - bone marrow transplant	\$153,200	0.4%	0.0%	\$569
025 - craniotomy & endovascular intercranial proc	\$55,758	0.8%	0.1%	\$333
236 - coronary bypass w/o cardiac cath w/o mcc	\$49,757	1.0%	0.3%	\$357

The second factor leading to Dartmouth-Hitchcock's higher mean reimbursement is somewhat the complement of the first, namely Dartmouth-Hitchcock's underrepresentation of inexpensive DRGs (**Table 4d**). Over the years 2008-2012, Vermont hospitals had a mean reimbursement of \$12,500, but three DRGs associated with childbirth - namely 775 for vaginal delivery, 766 for Cesarean delivery, and 795 for the newborn child - received much lower reimbursement. Vermont hospitals had 27.6% of their stays in these three inexpensive DRGs, while Dartmouth-Hitchcock had only 7.7%. The representation differences in these three DRGs alone caused Dartmouth-Hitchcock to have a \$2,579 higher unadjusted mean reimbursement.

⁴² The 'cost effect' is the product of the increased representation of the DRG among Dartmouth Hitchcock patients times the average payment per admission for the DRG across Vermont. Thus, DRG 470 for major joint replacement is an expensive DRG with a 4.9% higher representation at Dartmouth Hitchcock, and this alone would increase the average payment per admission by \$636, even if the payment for Dartmouth Hitchcock stays were the same as the average among Vermont hospitals.

Table 4d: The Effect of under-representation of inexpensive DRGs on Dartmouth-Hitchcock reimbursement per stay

DRG	DH reimbursement	% of DH stays	% of Vt stays	Cost Effect
775 – vaginal delivery w/o mcc	\$5,667	4.7%	13.9%	\$1,221
766 - Cesarean w/o cc/mcc	\$9,050	1.2%	3.4%	\$224
795 – normal newborn	\$1,780	1.8%	10.3%	\$1,134

One additional point to mention is that even though Dartmouth-Hitchcock generally receives 11%-24% higher commercial reimbursement for the same DRG, there are some common DRGs for which Dartmouth-Hitchcock receives lower reimbursements. The DRGs associated with joint replacement procedures - 470 (major joint replacement), 468 (revision of hip or knee replacement w/o cc/mcc) and 467 (revision of hip or knee replacement w cc), as well as DRGs 163 (major chest procedure w mcc) and 023 (cranio w major device implant/acute complex CNS procedure w mcc) all receive lower per stay reimbursement at Dartmouth-Hitchcock than averaged across Vermont. For example, Dartmouth-Hitchcock's per stay reimbursement for DRG 470 was \$3,773 less than the average of other hospitals.

5. States with largest spending for hospitalizations (total pooled 2008-2012)

Non-Vermont Hospitals with Largest Allowed Amounts (Commercial, 2008-2012)				
Provider ID	Provider Name	Stays	Ave. Allowed \$/Stay	Total Allowed \$
CONNECTICUT				
73737	Yale New Haven Hospital	33	\$37,111	\$1,224,648
15155	Saint Mary's Hospital	14	\$54,059	\$756,824
TOTAL				\$1,981,472
MAINE				
5221	Maine Medical Center	33	\$21,230	\$700,596
TOTAL				\$700,596
MASSACHUSETTS				
9977	Brigham and Women's Hospital	224	\$63,611	\$14,248,855
9148	Children's Hospital Boston	218	\$63,037	\$13,742,157
10997	Massachusetts General Hospital	215	\$60,513	\$13,010,388
9750	Alice Peck Day Memorial Hospital	754	\$8,624	\$6,502,333
9726	Cottage Hospital	307	\$10,894	\$3,344,381
17835	Spaulding Rehabilitation	42	\$52,011	\$2,184,445
10327	Baystate Medical Center	95	\$19,062	\$1,810,924
9978	Lahey Clinic Hospital, Inc	49	\$31,648	\$1,550,766
10314	Beth Israel Deaconess Medical Center	74	\$20,908	\$1,547,170
9291	Berkshire Health System (Berk Med Ctr)	70	\$20,618	\$1,443,229
9236	North Adams Regional Hospital	175	\$7,924	\$1,386,636
9738	New England Medical Center	41	\$28,016	\$1,148,657
9916	Dana Farber Cancer Institute	16	\$55,610	\$889,753
9132	New England Baptist Hospital	44	\$18,331	\$806,574
117263	UMMHC UMass Memorial Hospital	20	\$40,153	\$803,066
24050	Cooley Dickinson Hospital	31	\$18,125	\$561,867
9804	Franklin Medical Center	74	\$7,058	\$522,277
TOTAL				\$65,503,478
NEW HAMPSHIRE				
9104	Littleton Regional Hospital	495	\$10,805	\$5,348,705
16945	Cheshire Medical Center	480	\$10,246	\$4,918,066
191438	ITS MH Professional	172	\$10,860	\$1,867,950
14035	Hospital for Special Surgery	36	\$37,865	\$1,363,149
11166	Valley Regional Hospital	119	\$10,713	\$1,274,874
10346	Concord Hospital	43	\$18,693	\$803,820
9653	Weeks Medical Center	57	\$13,353	\$761,120
10304	Catholic Medical Center	20	\$32,835	\$656,696
148821	St Joseph's Hospital and Medical Center	1	\$560,364	\$560,364
TOTAL				\$17,554,744
NEW YORK				
17689	Albany Medical Center Hospital	371	\$27,885	\$10,345,434
14036	New York Presbyterian Hospital	24	\$74,741	\$1,793,782
9701	Memorial Sloan-Kettering	46	\$35,609	\$1,638,025
14139	St Peter's Hospital	64	\$17,981	\$1,150,782
48309	Montefiore Medical Center	3	\$350,574	\$1,051,722
14034	Mount Sinai Hospital	17	\$51,064	\$868,083

138167	Westchester Medical Center	13	\$65,664	\$853,629
9700	Glens Falls Hospital	86	\$7,084	\$609,249
TOTAL				\$18,310,706
OHIO				
9720	Cleveland Clinic Foundation	11	\$102,265	\$1,124,911
TOTAL				\$1,124,911
PENNSYLVANIA				
148187	Eastern Regional Medical Center	26	\$123,050	\$3,199,298
19352	Children's Hospital of Pittsburgh	5	\$186,549	\$932,743
TOTAL				\$4,132,041

Non-Vermont Hospitals with Largest Allowed Amounts (Medicaid, 2008-2012)				
Provider ID	Provider Name	Stays	Allowed \$/Stay	Total Allowed \$
MAINE				
5221	Maine Medical Center	7	\$9,415	\$65,908
TOTAL				\$65,908
MASSACHUSETTS				
9148	Children's Hospital Boston	357	\$51,414	\$18,354,962
186397	Mass General Hosp Ambulatory	95	\$14,929	\$1,418,212
9738	New England Medical Center	29	\$46,062	\$1,335,789
9726	Cottage Hospital	368	\$2,632	\$968,743
9977	Brigham and Women's Hospital	52	\$14,191	\$737,943
148363	Walden Behavioral Care LLC	38	\$14,434	\$548,475
9236	North Adams Regional Hospital	132	\$3,546	\$468,041
10327	Baystate Medical Center	39	\$10,963	\$427,540
17835	Spaulding Rehabilitation	8	\$52,641	\$421,129
9978	Lahey Clinic Hospital Inc	16	\$15,453	\$247,256
10314	Beth Israel Deaconess Medical Center	26	\$7,388	\$192,093
9291	Berkshire Health System (Berk Med Ctr)	19	\$4,489	\$85,284
117269	UMMHC (UMass Memorial Med Ctr)	15	\$3,790	\$56,853
TOTAL				\$25,262,320
NEW HAMPSHIRE				
16945	Cheshire Medical Center	282	\$3,503	\$987,716
9750	Alice Peck Day Memorial Hospital	330	\$2,951	\$973,989
9104	Littleton Regional Hospital	284	\$3,033	\$861,426
11166	Valley Regional Hospital	67	\$2,941	\$197,042
9653	Weeks Medical Center	55	\$2,689	\$147,905
10304	Catholic Medical Center	4	\$13,476	\$53,904
TOTAL				\$3,221,982
NEW YORK				
17689	Albany Medical Center Hospital	565	\$8,813	\$4,979,194
14139	St Peter's Hospital	32	\$8,453	\$270,500
9153	CVPH Medical Center	37	\$3,965	\$146,697
TOTAL				\$5,396,391
TENNESSEE				
131132	St Jude Children's Research Hospital	5	\$15,598	\$77,990
TOTAL				\$77,990

Health Spending Growth Drivers in Vermont, Medicaid and Commercial Insured, 2008-2012

Appendix B: Technical Notes

1. Hospital inpatient care

Inpatient spending includes the spending on facility services provided to patients, while admitted to acute hospitals (including bill type codes 11, 12, and 85). The inpatient analysis excludes spending on services performed and separately billed by physicians and other professionals, which is included in the professional component of spending drivers. In order to standardize service classification and appropriately measure case mix, all inpatient admissions in all years of the study were assigned by Truven Health Analytics to a diagnosis related group based on diagnoses and procedures.⁴³

Defining change in resource mix: Admission counts, total spending, and DRG resource weights were calculated for each year and hospital. Such DRG resource weights are assigned to inpatient diagnostic related groups (DRGs) based on a consistent algorithm in order to denote average appropriate resource use. These weights are useful for adjustment in making comparisons to national norms, or to measure changes in average appropriate resource use across time. A hospital's appropriate resource use per patient is sometimes referred to as its 'intensity' of services and is one of the three major components of a spending decomposition. A change in a hospital's average intensity of service from year to year may be due to either a change in case mix (e.g., more severe patients) or a change in the anticipated resource use to treat similar patients in different years (e.g., between 1985 and 1986 cataract replacement changed from a surgery requiring up to a 3-day stay to a same-day procedure). The analyses of Vermont's hospital inpatient spending decompose the growth rate from 2008 to 2012 into price, intensity, and volume components. The analyses are based on VHCURES hospital facility claims (excluding professional services that occur during the stay). Claims provide variables for allowed payment, diagnoses and procedures, hospital identity, and patient characteristics. The components of growth are calculated by type (e.g., commercial, Medicaid, etc.) and per category (e.g., per region, per critical access status, etc.) after summarizing allowed payments, DRG weights, and number of stays. As the formulas below show (with 2008 as base year b and 2012 as target year t), the volume growth component uses only total inpatient stays for its calculation, while price growth and intensity growth are based on divided totals in each year. The four-year volume growth total is the ratio of 2012 number of stays to 2008. The four-year price growth rate is the ratio of allowed payment per DRG in 2012 to allowed payment per DRG in 2008, and the four-year intensity growth rate is the ratio of average DRG weight per stay in 2012 to the same measure in 2008.

$$\begin{aligned} \text{Four Year Price Growth Rate (2008 to 2012)} &= \text{Price}_t / \text{Price}_b - 1 \\ &= \frac{(\text{Total Allowed Payment}_t / \text{Total DRG weights}_t)}{(\text{Total Allowed Payment}_b / \text{Total DRG weights}_b)} - 1 \end{aligned}$$

$$\text{Four Year Intensity Growth Rate (2008 to 2012)} = \text{Average DRG weight}_t / \text{Average DRG weight}_b - 1$$

⁴³ Truven Health Analytics Disease Staging Software v 5.26

$$= \frac{(\text{TotalDRG weight}_t / \text{Total Stays}_t)}{(\text{TotalDRG weight}_b / \text{Total Stays}_b)} - 1$$

Four Year Volume Growth Rate (2008 to 2012) = $\text{Total Stays}_t / \text{Total Stays}_b - 1$

Each four year growth rate, $p_{4\text{yr}}$, can be annualized as follows: $p_{\text{annual}} = (1 + p_{4\text{yr}})^{1/4} - 1$

The total growth rate p associated with price growth rate p_1 , intensity growth rate p_2 , and volume growth rate p_3 is given by: $(1 + p) = (1 + p_1) * (1 + p_2) * (1 + p_3)$. By expanding and subtracting 1 from both sides, p is found to be the sum of the growth components, $p_1 + p_2 + p_3$, plus interaction terms (e.g., $p_1 p_2$). The existence of interaction terms in a decomposition analysis is inevitable, but is usually small. Interactions may be allocated proportionally among the decomposition components, but we did not choose to do so. Instead each calculated decomposition component derives from an exact formula without further adjustment. During the study period, there were revisions and additions to the set of DRGs and modifications of existing DRG weights. While no method of adjusting for all of these changes would be perfect, we felt that in light of these changes, the fairest approach to decomposing growth into price and intensity components would be to classify the DRGs of hospital stays based on the algorithm consistent with the year in question. Thus, DRGs for 2008 were based on version 25 of the MS-DRGs and DRGs for 2012 were based on version 30. Our concept of change in intensity therefore is really the combination of two changes – a change in patient mix (which would be determined by using the same DRG version across years) and a change in appropriate resource use (which would be determined by applying version 25 and version 30 to the same set of patients).

2. Outpatient facility and professional services

Outpatient facility and professional services growth drivers of price, volume and service mix were also analyzed. Because in the outpatient setting a standard service such as a hospital admission is not available, a different method was used to measure these drivers over time. Calculation of the price growth component was derived from a “market basket” approach, whereby standardized quantities and mixes of items from defined service categories⁴⁴ were used to determine the growth in allowed payments over time. For the years 2008 and 2012, claims data on allowed payments for a market basket of services were used to calculate average unit prices within service categories, and corresponding total allowed payments.

For each setting (outpatient services or professional services), the ratio of 2012 to 2008 allowed payments for the market basket represents Vermont’s four-year price growth. The component of growth due to volume is based on the weighted change in total units of service, with the weights based on average price per service category unit across target and baseline years. Finally, the service category

⁴⁴ An obvious feature of this method is that it takes into account a more expensive service substituting for a less expensive service over time (e.g., an MRI, or an even more expensive 3-D MRI, substituting for a scan) as a price effect. Some providers would want this classified as a service mix (technology) effect. Our use of broad service categories in the calculation of price and service mix growth rates will equate services that many providers would not want to see made equivalent.

mix growth component is the residual change not attributable to these first two components. The service category mix component reflects changes in the proportional use of categories of services that differ from overall change. For example, it would reflect the degree to which outpatient pharmacy and radiological services have disproportionately grown during the period. Formulas and further details of the methodology used for decomposition of growth are provided at the end of this section. For outpatient facility services, in order to assemble a market basket of services, we classified services into homogenous service categories based on Revenue Codes. These were aggregated into ten Revenue Center service categories: dialysis; durable medical equipment; lab/pathology; other ancillary; outpatient surgery; pharmacy/supplies; professional fees within facilities; radiological services; and therapeutic services.

For professional services, HCPC procedure codes were available, and were used to create standard Berenson-Eggers type of services (BETOS) categories. Within the standard BETOS categories there are three categories specific to Medicaid claims for special services, including vendor services and some specific to behavioral health. The proportion of special codes in Medicaid claims limits the direct comparison of professional services between Medicaid and commercial payers.

Details of the decomposition methodology for facility and professional service spending:

This section explains how the total expenditure growth over the study period is decomposed into price, service category mix, and utilization change. We formulate expenditure growth as:

Expenditure Growth = Total Expenditure in Target Year – Total Expenditure in Baseline Year

Using notations of N_{tj} and N_{bj} for number of services within service category “j” in Target Year and Baseline Year respectively, and P_{tj} and P_{bj} for average price per service in Target Year and Baseline Year for the same service category of “j”, we can symbolize the expenditure growth formula as following:

$$\text{Expenditure Growth} = \sum_{i=1}^n N_{ti} * P_{ti} - \sum_{i=1}^n N_{bi} * P_{bi}$$

Expenditure growth was then mathematically divided into its components:

$$\begin{aligned} &= \sum_{i=1}^n (P_{ti} - P_{bi}) * \frac{1}{2} * (N_{bi} + N_{ti}) \quad (\text{Price increase portion}) \\ &+ \sum_{i=1}^n [(N_{ti} - N_{bi} * \frac{\sum_{i=1}^n N_{ti}}{\sum_{i=1}^n N_{bi}})] * \frac{1}{2} * (P_{bi} + P_{ti}) \quad (\text{Contribution of Service Category Mix change}) \\ &+ \sum_{i=1}^n [(N_{bi} * \frac{\sum_{i=1}^n N_{ti}}{\sum_{i=1}^n N_{bi}}) - N_{bi}] * \frac{1}{2} * (P_{bi} + P_{ti}) \quad (\text{Contribution of Service Volume Increase}) \end{aligned}$$

Multiplied by the appropriate prices and summed, the contribution of each to spending growth can be calculated. For example, if the volume of the imaging services in base year was 1,000 and the overall rate of utilization increase for entire market basket has been 15% then the proportional (expected) utilization of imaging services in target year should have been equal to 1,150 = 1,000*(1+0.15). If the

actual (observed) utilization in the target year is 1,300 then the imaging services have increased disproportionately and in a pace faster than the overall pace for entire basket. So, any disproportionate change in volume is multiplied by the mid-point price to provide an estimate of the “Contribution of Service Mix Change.” The resulting contribution of the various changes in service category mix would be positive, if the change in mix moves toward high price service categories, and negative if the change in mix moves toward lower price services. In other words, if a health system adopts more inexpensive technologies (pharmacy), while reducing use of alternative expensive ones (outpatient surgeries), the contribution from the service category mix component could be negative. Finally, the component of spending change attributed to utilization is a weighted sum of utilization across all service categories, with the weights being mean unit prices averaged across target and baseline years. This component reflects how much spending would change, if use within service categories all changed at the same rate.